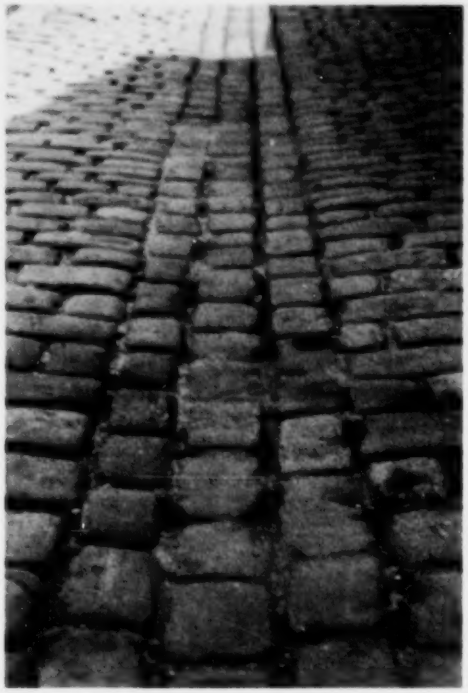
The Learning Mosaic:

A multiple perspectives review of the Alberta Initiative for School Improvement (AISI)



By
Andy Hargreaves, Robert Crocker, Brent Davis, Lori McEwen,
Pasi Sahlberg, Dennis Shirley & Dennis Sumara with Maureen Hughes

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The views and recommendations expressed in this report are those of the researchers and not necessarily those of Alberta Education.

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Table of Contents

List of Figures iv
List of Tables iv
Executive Summary v

Chapter 1: Investigating AISI 1
Andy Hargreaves, Boston College

Chapter 2: Rethinking the AISI Research Model: Secondary Data Analysis and Future Applications 9
Robert Crocker, Atlantic Evaluation and Research Consultants

Chapter 3: Using Complexity Science to Study the Impact of AISI on Cultures of Education in Alberta 34
Dennis Sumara & Brent Davis, University of Calgary

Chapter 4: AISI: A Qualitative Case Study 51
Dennis Shirley & Lori McEwen, Boston College

Chapter 5: The Four Ways of AISI 62
Andy Hargreaves, Boston College

Chapter 6: AISI: A Global Perspective 77
Pasi Sahlberg, Centre for International Cooperation and Mobility

Chapter 7: Findings 90
Andy Hargreaves, Robert Crocker, Brent Davis, Lori McEwen, Pasi Sahlberg, Dennis Shirley & Dennis Sumara

Chapter 8: Recommendations 106
Andy Hargreaves, Robert Crocker, Brent Davis, Lori McEwen, Pasi Sahlberg, Dennis Shirley & Dennis Sumara

List of Figures

Figure 2.1 Average Effect Sizes for AISI Cycle 1, Cycle 2 and Cycle 3 (first two years) 14

Figure 3.1 Four types of general network structures (drawn on identical sets of dots): centralized, decentralized, fragmented, and distributed 35

Figure 3.2 Some triggers for movement among different network structures within social systems 36

Figure 5.1 The First Way of Venus 64

Figure 5.2 The Second Way of Mars 68

Figure 5.3 The Third Way of Mercury 72

Figure 5.4 The Fourth Way of Earth 74

Figure 6.1 Building of Enriching Communities 85

Figure 6.2 Community-Energy Tensions in School Improvement 87

List of Tables

Table 2.1 Statistically Significant Results for Cycle 2 Themes and Strategies by Measure 17

Table 2.2 Statistically Significant Results for Cycle 3 Themes and Strategies by Measure 20

Table 2.3 Consistent Mean Effect Sizes by Theme/Strategy and Measure, Cycles 2 and 3 22

Table 2.4 Consistent Theme and Strategy Effects for Effect Size and Actual Outcomes by Measure 25

Executive Summary

In October 2008, as it embarked on its ninth year of implementation, the Alberta Initiative for School Improvement (AISI) held a province-wide colloquium to take stock of the progress of AISI to date and to help set directions for the future. Involving key stakeholders, members of AISI's partnership, AISI staff from the School Improvement Branch of Alberta Education, and AISI project leaders, the colloquium established an open and transparent process of dialogue and reflection about AISI's strengths and limitations. Colloquium participants discussed small and large adjustments that may be needed in reshaping AISI's future to secure the best possible outcomes for the province's schools.

AISI invited to the colloquium several researchers who acted as critical friends for the initiative. They participated in dialogue, observed AISI presentations, interacted with stakeholders, and responded to a range of the extensive documentation on AISI and evaluations of AISI that had been produced to date. Robert Crocker, formerly of Memorial University in Newfoundland, contributed his considerable expertise in experimental and survey design as well as statistical meta-analysis of existing data sets to raise issues regarding the measurement of AISI's impact. Dennis Sumara and Brent Davis, then at the University of British Columbia, presented their field-leading work on complexity theory and its uses in education, and provided initial feedback on how AISI may or may not be operating as a complex system. Andy Hargreaves, formerly of the Ontario Institute for Studies in Education and now at Boston College, offered some initial observations on AISI's architecture as a change strategy and its similarity to and difference from other systemic change strategies. Finally, Pasi Sahlberg, incoming Director of the Centre for International Cooperation and Mobility in Finland, provided his observations from an international policy perspective.

Following the colloquium, these contributors were invited to undertake deeper research on the design, impact and future of AISI, including its sustainability. Sixteen research questions were finalized in February and March 2009 through a process of consensus by the research team and Alberta Education. Five of these were overarching questions:

1. *What is the distinctive theory-in-action (change architecture) of AISI?*
2. *What is the value of AISI? (What are the values of AISI?)*
3. *Is it possible for jurisdictions to do these projects and activities without AISI?*
4. *Would the values of AISI continue without funding?*
5. *Has AISI changed the culture of education in Alberta? If so, how has it?*

These were supplemented by eleven subsidiary questions:

1. *What have been the successes of AISI, as assessed from multiple perspectives?*
2. *What are both the obvious and the subtle impacts of AISI?*
3. *How is AISI lived and practiced by educators?*
4. *What are the change processes at play for administrators and teachers?*
5. *What have been the difficulties and challenges of AISI?*
6. *Has AISI encouraged school authorities to try new things?*
7. *Has AISI encouraged those involved to take risks and to be more innovative?*
8. *What are the opportunities to expand the measures of AISI projects from the vantage point of complexity theory?*
9. *What are the opportunities to disseminate knowledge generated by AISI by using its networks and complexity thinking? Have these opportunities been used to promote change across AISI jurisdictions?*
10. *How has AISI influenced policy developments at the school, jurisdictional, and provincial levels?*
11. *What are the implications of the research findings for AISI as a work in progress?*

Andy Hargreaves agreed to serve as overall project coordinator for three research teams to provide multiple perspectives on AISI. Pasi Sahlberg would be a critical friend who was also appointed to the project and would advise AISI on its work in light of global trends in education and especially on the needs of high-skill, high-achievement knowledge societies.

Components of the Review

The multiple perspectives review is organized in three data-based studies and two reviews that relate AISI to educational reform trends elsewhere.

1. The Quantitative Meta-analysis

The first research study, by Robert Crocker, is a meta-analysis of existing provincial data sets concerning tested achievement results, as well as survey data of satisfaction levels for parents, students and teachers, in relation to the effects of AISI. This study tries to ascertain whether there were observable changes over time and across main AISI themes and strategies, the extent to which these changes could be attributed to AISI, and whether some AISI themes and/or strategies were more effective than others in relation to valued outcomes. In addition, this study evaluates the suitability of existing data sets and data gathering processes for determining the impact of AISI and makes suggestions for future improvement in AISI's subsequent funding cycles.

Given that AISI was designed as a school improvement strategy rather than an experimental or quasi-experimental research design, it is not possible to clearly separate AISI effects from other changes that may have occurred. However, positive change has taken place over time and across AISI projects and measures. Effects are larger for surveys than for achievement measures. This raises the possibility of a Hawthorne or halo effect in which individuals attribute value to an intervention not because of the inherent value of the treatment but rather because of the added attention being shown for their work—though this very attention and involvement is a significant contribution to teacher morale.

Traceable gains on provincial achievement tests are marginal, which could be a source of concern. On the other hand, external factors—such as rising immigration trends in Alberta, an influx of new teachers prepared in other provinces, a surge in retirement of experienced teachers, and especially the increase in the percentage of English language learners—cannot be separated from AISI outcomes in terms of the available data base and research design. Indeed, the lack of a decline in achievement scores related to AISI in this context could be regarded positively.

In general, despite the most rigorous efforts, it is exceedingly difficult to isolate the independent effects of AISI using retrospective quantitative data. This is because

- only some AISI projects are designed to have a deliberate impact on tested student achievement;
- AISI involves almost all Alberta schools and has been increasingly integrated with other initiatives and developments for a decade;
- Existing province-wide data sets are not amenable to tracing the impact of different AISI projects on particular students;
- projects are often complex and developmental so that treatments do not follow experimental design principles with consistent replication from one site to another or one year to the next; and
- the data collected by teachers within projects such as provincial achievement test scores or satisfaction surveys are sometimes not suitably aligned with the purposes of their projects.

2. Three Contrasting Case Studies of District Implementation

The second research study by Davis and Sumara analyzes how three school district cultures influence the development of AISI projects in their jurisdiction.

The first school district emphasizes *learning* as its central purpose and is able to use AISI funds to amplify its pre-existing mission to increase learning for all students and teachers. Most AISI resources were used to further webs of connectivity and communication among teachers. Resources are allocated to releasing teachers' time for meeting and coaching in their schools—spreading teacher leadership across the profession and enabling teacher leaders to stay close to classroom practice. The district's decentralized network structure binds it together through frequency of interaction, learning and change, across schools. There is no insistence on direct control at every point by the district administration. One result is strong personal relationships, high trust and intense professional learning across the district.

The other two districts are less successful in establishing a learning culture for students and teachers. The second district promotes *service* as the work for the district. Educators work extremely hard, they are bound by a common moral purpose, and personal sacrifice of time and energy is a pervasive virtue. However, personal relations and lines of authority operate in a largely vertical fashion and schools are not well connected to each other except through common training and implementation events. Teacher leadership largely takes teachers out of the classroom into consultant positions in the district office. This results in the district's focus being something of a mystery to many schools. This makes it difficult for the district to play an active role in producing new kinds of knowledge.

The third district employs a *managerial* framework that realizes the aspirations of the educational leaders for control of teachers and accountability for outcomes. Initiatives are aligned with a single district focus that is in turn related to a provincial "thrust." Resources are allocated to employing consultants in the district office, and hiring external out-of-province trainers to distribute training packages and run workshop events. There is little independent interaction between or learning among schools independently of these events and schools have little awareness of each other's activities. Teachers become depleted by what they experience as excessive auditing of their instruction without a parallel system of continuing support and development for their teaching.

This study indicates that external improvement initiatives such as AISI *amplify* the pre-existing mindsets of district administrators. All three district sites use AISI funds to extend their already established principles and strategies. They do not use the funds to reflect critically upon goals and interventions that are already in place. If AISI is to change existing district cultures and their impact on learning and teaching, it will be necessary to develop robust new strategies for organizational learning that transcend district boundaries. One possibility would be to fund networks of learning where educators from one district visit peers in others. Some of this interaction should be school to school, without all interactions being orchestrated by vertical district control. Across districts there was a rather remarkable knowledge of contemporary educational research, and this phenomenon was consistently attributed to AISI. There were also pockets of remarkable innovation in the districts visited, with occasional deep commonalities in interest, expertise, and activity across jurisdictions. At the same time, there seemed to be little sustained and meaningful collaboration among jurisdictions, raising the possibility that the time may be right for a more deliberate strategy of connecting and collaborating within the initiative. AISI needs to stress the importance of creating new knowledge through school-based innovation as in the first district and not just disseminating existing knowledge through measures such as workshops and training programs as in the other two. In recognition of this need, AISI leaders have already begun catalyzing cross-district learning by requiring project applicants in Cycle 4 to learn from the work other districts have already undertaken in areas with affinities to their proposed project goals and strategies.

3. Cross-site Case Study

The third study by Shirley and McEwen is a qualitative condensed case study of 12 varied and geographically dispersed school districts supported by AISI. This study employs interviews and focus group discussions as well as analysis of school, district and project documents, to gather data about the meaning and value of AISI among educators and district personnel involved in and responsible for design, implementation, and assessment of AISI activities at the district level. This up-close view of AISI provides evidence of the perceived architecture, impact, strengths and challenges of AISI as well as the context in which AISI operates among those who are most closely engaged with it.

The research findings indicate that AISI enjoys enormous popularity among educators. They credit it with helping them to advance their skills as thinkers, researchers, and practitioners. Teachers state that they have acquired new skills as researchers and change agents who identify problems in children's learning, collaborate with colleagues to formulate potential solutions, and then acquire funding, skills and support to put their professional knowledge to work. Educators have side-stepped the kinds of short-term strategies that lead to "gaming the system" to get test scores up. Instead, they are asking more profound questions of themselves and of their colleagues. They are challenging each other to work with students to establish agreed-upon criteria for excellence in learning and they are providing children with multiple ways to acquire and demonstrate excellence. They are embedding technology into a repertoire of instructional strategies that presume inteligence and voice on the part of learners.

Alberta educators feel that their long-term vision of educational change matters and that it plays a role in shaping the future policies of their province. They are undoubtedly at the leading edge of efforts to professionalize teaching internationally, through their promotion of collegial interaction, change advocacy, professional networks, sustained inquiry and responsibility for results.

This report finds that areas in which AISI needs to push further include

- increased parent and community engagement in the focus of AISI projects and throughout the whole AISI process;
- a stronger focus and greater impact on secondary schools;
- creating an accountability system that is less cumbersome, yet that develops and deploys more robust indicators of progress that are related to the project goals that schools pursue.

Of these three areas, the research team notes that AISI has increased emphasis on parent and community engagement in Cycle 4.

4. The Four Ways of AISI

Andy Hargreaves draws on the three above components of the review and other previous research studies of AISI to judge how AISI compares to four ways of system-wide change that are and have been evident in international educational change strategies. He argues that *four change imperatives* now confront all educational leaders and change agents—economic reconstruction, social cohesion, ecological sustainability, and generational renewal. The challenge for policy makers, he says, is to respond to these four imperatives in order to generate the changes that are appropriate for the 21st century.

Hargreaves argues that AISI has gone well beyond a 1970s *First Way* of change that emphasized innovation and generous state funding but failed to develop parallel systems of professional responsibility, accountability, and also consistency. AISI also has surpassed *Second Way* mindsets of the 1980s, in which educators in other jurisdictions were subjected to increasingly political control, public skepticism and market competition. By promoting high levels of public confidence in educators and by emphasizing creativity, complexity, innovation, and teamwork, AISI would appear to have institutionalized *Third Way* principles of the 1990s that used networks and data to drive reform through recalcitrant systems and educators.

For many contemporary school reformers, the development of such "data-driven decision making" among educators represents the culmination of decades of efforts to improve and secure teaching as a profession. Yet increasing international evidence indicates that such a framing of contemporary education injects a managerial tenor and competitive framing into schools that in many ways undermines their moral and collegial fabric. For this reason, Hargreaves indicates that policy makers in Alberta would be well advised to consider the role that AISI might play in promoting a *Fourth Way* of change that values data along with teachers' professional judgment and balances targeted interventions in children's areas of academic weaknesses along with more mindful approaches to teaching and learning that nourish creativity, innovation, and the "soft skills" of teamwork and compromise.

5. *Global Policy Perspectives*

Hargreaves' challenge to policy makers to fortify and extend AISI's already significant contribution to Albertan education is next complemented by Pasi Sahlberg, who considers AISI from the vantage point of his scholarship on knowledge societies and especially high-achieving Finland. Sahlberg notes that AISI's change architecture promotes systems-level change and not just a loose accumulation of localized initiatives. He praises the generous and continual allocation of substantial resources to AISI and their encumbered nature, which prevents them from being bled off into staff replacements or other expenditures that are especially salient in a time of economic contraction.

Enjoying high-level provincial leadership, inviting grass-roots initiatives, and encouraging mid-level school district coordination and learning, AISI is viewed by Sahlberg as "a shining star in the sky of global large-scale school improvement." Sahlberg credits AISI leaders and Alberta Education with the development of a carefully conceived and highly responsive change network that is perhaps unique in its support for the technical core of teaching and learning that occurs between teachers and students. Sahlberg concludes that "It is difficult to find anywhere a comparable change effort that would be of the scale, size and overall magnitude as AISI."

Sahlberg, like Hargreaves, encourages AISI to consider two further developments for its medium and long-range planning. First, he suggests that the central management of AISI expand the definition of public engagement in AISI Education Partners to include individuals from youth, sports, or business sectors. Second, he finds that although there is evidence of some lateral networking among AISI projects and districts, this dimension of the work—the "communicative connectivity" in the language of Davis and Sumara—could be strengthened and would benefit AISI in the future.

Overall Findings

This section summarizes the findings of the review. It is organized by the overarching questions.

AISI constitutes a world-class and world-leading example of a system-wide educational strategy. This strategy, designed by Alberta Education and its partners, inspires teachers and administrators. It enhances their professional growth and enthusiasm. AISI seeds new, research-informed practices within local communities then spreads them across districts and schools; and it diffuses existing knowledge as well as creating new knowledge.

AISI embodies a change process that addresses the complexity and adaptability necessary in a fast-moving, knowledge-driven world. It avoids the excesses of unregulated chaos and permissiveness of uncoordinated innovation on the one hand, and of hierarchical and inflexibly linear systems of top-down or layered implementation on the other. It achieves all this new and ground-breaking work with no discernible negative impact on the exemplary record of student performance as measured by provincial achievement tests for which Alberta has become world-renowned.

AISI has unfolded in a continuous culture of inquiry, openness, reflection and adaptation that is rare among government-sponsored innovations. The School Improvement Branch of Alberta Education does not merely endure critical feedback but actively solicits and then rapidly responds to it. All projects have onerous accountability requirements and have been subject to rigorous evaluation, leading to clear consequences of adaptation, change, and shifts of focus or direction. In the past decade, AISI has transformed and continues to transform

1. *from* a project-driven and initiative-driven approach *to* a more embedded and continuous change process and strategy;

2. *from* a predictable, time-bound planning process of uniform funding cycles, *to* a more flexible process of planning and development;

3. *from* a collection of disconnected or loosely connected projects *to* a province-wide network of improvement and innovation;

4. *from* a change process that has swung between bottom-up and top-down orientations in the first two cycles, *to* a change process that balances and integrates these dynamics and also adds a strong, lateral peer-driven change dynamic in the third and fourth cycles;

5. *from* a strategy to spread and embed existing knowledge in order to enhance improvement and implementation, *to* a strategy that also creates new knowledge in support of increased innovation.

There are also some limitations of AISI so far. For example, elementary schools have embraced AISI more deeply than high schools, where teachers' understandings of their roles as experts in the area of academic content knowledge have made it difficult for them to focus on the province's learners and their current and future needs. AISI also needs to work more deliberately on leadership development, and especially on modifying the roles of principals and other staff to support the development of teachers. AISI projects can also benefit from more robust knowledge dissemination and exchange across district lines. Finally, there is scope for more explicit attention to the development of stronger relationships with parents and other community members. These and other findings are organized in relationship to the five overarching questions that guided this study and are elaborated in a following section on recommendations.

1. What is the distinctive theory-in-action (change architecture) of AISI?

AISI promotes and funds locally-developed, district-led innovations and improvements. It networks educators and parent and community members together through schools, conferences, and a web-based AISI Clearinghouse. To do so, AISI has a four-dimensional architecture:

1. *vertical* – top-down and bottom-up;
2. *lateral* – project-to-project, school-to-school;
3. *radial* – outside-in and inside-out research expertise and practitioner inquiry;
4. *temporal* – connecting medium-term and longer-term perspectives.

AISI is a complex mixture of top-down, bottom-up and laterally-driven change. It is guided by the AISI Education Partners Steering Committee and managed (but not micromanaged) by the School Improvement Branch (SIB) of Alberta Education. SIB works collaboratively with the AISI partners to set priorities and strategic directions for each cycle. SIB manages three-year project cycles; it further manages the application and approval process, coordinates conferences and updates a website Clearinghouse to create connectivity across projects. SIB operates in a consistently transparent, inclusive and responsive way, with a quiet passion for locally-grounded and professionally driven change that serves the public good of all students. It sees its role as facilitating, steering and gently but firmly monitoring and revising this process over time.

From the bottom-up, AISI's theory-in-action empowers educators to develop professional and intellectual projects based on their own locally-created needs assessments and subsequent initiatives for self-initiated change. Many of these projects come from the individual passions or recent professional development experiences of teachers and administrators who connect their initiatives to the priorities in the current AISI Cycle. Others – up to 40% per cycle – are selected by districts in relation to province-wide themes such as differentiated instruction, professional learning communities (PLCs) or assessment for learning that are AISI priorities and also related to a more general policy thrust in Alberta Education. Although all projects feel local in location, many are nonetheless provincially central in origin. Irrespective of the source, what matters in any project is the degree of ownership teachers and school administrators feel towards it.

AISI is not only bottom-up, top-down and lateral in nature; it also is radial, combining inside-out and outside-in change processes that penetrate into its core and back out again. Several districts have collaborated with university faculty at various points in their project cycles and received assistance in designing surveys, studying student achievement data, and modifying assessment practices. Annual AISI conferences also connect participating schools to outside expertise and feedback. AISI has made explicit the connection between academic research and professional practice. External stimulation and assistance are balanced and integrated with internal study and reflection.

Like all change strategies, AISI also has a fourth dimension: time. AISI's three-year cycles establish longer timelines for change, action and results than is common in most other system-wide reform efforts. In less stable political environments, these are usually driven by the demand for measurable short-term achievement results. In these other cases, this culture of short-term planning and thinking can deplete energy and distract attention from securing the longer-term transformations in teaching and learning that are more appropriate for competitive knowledge economies. AISI largely avoids these distractions through an approach that is iterative, transparent, and participatory. Project participants consistently praised AISI staff for their accessibility and respect for the on-the-ground realities of teachers and school staff.

Some respondents advised greater fluidity in terms of entry to and completion of AISI projects. They also suggested it would be prudent to reduce the accountability demands on projects, which were described as onerous. Last, the case studies and school district reviews indicated that while interconnection (or connectivity) across schools within districts is strong, it is underdeveloped across districts. Districts also vary in how they articulate school interconnections. On the whole, though, the current change architecture of AISI enables its project leaders, in collaboration with district personnel, to develop an approach to student learning and staff development that is more inquiry-oriented, reflective, and sustainable than most strategies.

2. *What is the value of AISI? (What are the values of AISI?)*

Positive changes over time were found for all measures in all three AISI cycles. AISI's impact on provincial achievement tests (PATs) was small but larger for local achievement measures and survey measures. Discernible effect sizes on PATs are rather modest, and many seem attributable to being statistical artifacts of, for example, regression towards the mean or outlier effects.

PAT results can be interpreted in a number of ways. One potential explanation is methodological. PAT data are not easily connected to traces of particular students who have experienced specific AISI initiatives. Another possible explanation is systemic. AISI has become increasingly integrated into the educational system and improvement processes of the province as a whole. It is a complex reform, not a simple treatment or intervention, and part of its success is its increasing influence on the educational culture in general. Highlighting its independent impact is far from easy. One promising step forward might be to design some AISI projects as experimentally controlled interventions.

The strongest AISI impacts were on measures of teacher growth. It is possible that these represent a halo or Hawthorne effect although that in itself is an indicator of teachers' appreciation of the trust, resources and recognition that are accorded to them in the AISI architecture. Our review's qualitative findings suggest something deeper is also at work in terms of AISI's impact on teachers' sense of professionalism and on the development of teacher leadership opportunities and experiences. These factors represent AISI's values as much as its actual value.

Informants all agreed that AISI is catalyzing authentic and deep conversations about teaching and learning that are contributing to a richer repertoire of instructional practices and improved student learning in Alberta. They credited AISI with giving them new ways to observe student learning, identify obstacles to achievement, and revise instruction so that their students learn at high levels. By exposing educators to alternative sets of practices, by embedding ongoing support into schools through AISI-funded lead teachers and consultants, by connecting teachers and projects to each other in relationships of mutual learning and support, AISI has helped to re-ignite teachers' curiosity about new and better ways of teaching their students.

3. Is it possible for jurisdictions to do these projects and activities without AISI?

Educators tended to view AISI not so much as the point of departure for new values, but rather as an opportunity and funding source to realize values they already cherished but found difficult to fulfill. Districts needed funding to support AISI consultants, to provide teachers with release time to learn from their colleagues, to purchase resources, and to send teachers to professional development activities such as the annual conferences of the Alberta Assessment Consortium. Especially in remote rural districts, the opportunity to leave small towns to access new ideas and research findings at provincial or regional conferences and establish lateral learning networks with educators in implementing them was priceless. Districts would almost certainly not

AISI has also helped combat conservatism in the culture of teaching and administration by promoting a culture of risk-taking. In his remarks at the AISI Conference in February 2009, Alberta's Minister of Education, Dave Hancock, communicated that mistakes were to be expected and welcome along the way to meaningful school change. Such encouragement was very much appreciated by educators who were eager to pilot new initiatives and to take greater risks to reach disengaged students.

Teachers stated that AISI projects offered just the right amount of risk and reward for those who loved teaching yet also wanted to explore other dimensions of the educational profession. AISI enables teachers to develop new skills in the areas of experiential education, technology development, and local history that may not be directly linked to gains on provincial achievement tests but nonetheless have great educational value. This approach is integral to the deployment of 21st century professional skills in a rapidly changing, culturally diverse and knowledge-driven society. It is essential to a learning mindset.

4. *Would the values of AISI continue without funding?*

Many participants from elementary schools said the cultures of their schools had changed and the practices that came about due to AISI were now embedded in their schools. In secondary schools, AISI values were embedded in some departments but others conserved a transmission model of education that did not promote student engagement. Gains are being made at the high school level, but AISI project leaders indicated that improvements require more careful modeling and support for faculty over time of the kind that appears to be the case in elementary schools.

The districts and cultures most likely to sustain AISI values in the absence of continuing funding are those that already operate as complex and effective learning communities. These districts have established the organizational cultures that support teachers' continued introspection, collaborative inquiry, and adjustment of instructional practices. Such districts organize their leaders and not just their teachers into PLCs to study data and research and to inquire into and improve instructional supports.

The Davis and Sumara study of contrasting district implementation indicates that some districts organize their cultures more around foci such as service and management that tend to concentrate leadership centrally and administer projects vertically rather than around learning, where both leadership and innovation are distributed more laterally and bound together by frequent, complex interaction. The former types of districts may find it difficult to accomplish the learning goals they have established for themselves because they conflict with pre-established institutional cultures that make learning subsidiary to service or management. AISI values can be piloted in such organizational cultures, but they cannot become embedded, and they are unlikely to be sustained without funding and also a development of networking structures within AISI that may stimulate productive disturbance of these existing district cultures.

Some educators expressed anxiety that AISI funding might be folded into base budgeting, let alone discontinued entirely, especially in a time of economic contraction. They worried that without clearly marked funding, the sorts of innovative, grass-roots projects associated with AISI will fade away. They feared that without continued support for AISI as an autonomous agency, their schools would not prosper from the opportunity to mature into the more complex learning systems and sources of innovation that Alberta will need for its students to thrive in the future.

5. *Has AISI changed the culture of education in Alberta? If so, how has it?*

AISI's change architecture has led to clear shifts in the culture of teaching and improvement in Alberta. We found many instances of AISI influencing school and district policies in ways that represented a marked shift in understandings about teaching and learning at the school and classroom level. This was evidenced in the creation of common report cards, the alignment of curricular content with local assessments, and the development of principals as instructional leaders of learning, for example.

Instead of seeing assessments as unwanted external impositions of provincial achievement tests, the emphasis on assessment for learning has helped teachers grasp the value of diagnostic and formative assessments that can support their classroom practice. There is room for further growth in terms of teachers and schools developing and deploying more of their own designed or chosen quantitative instruments and indicators so they can monitor impact of and progress in their self-designed initiatives; but the emphasis on assessment for learning in AISI's third cycle has undoubtedly started to lay a foundation of a learning-driven culture of greater assessment literacy.

One clear and demonstrable impact of AISI on the wider educational culture of Alberta is in terms of consolidating and extending a strong and enthusiastic culture of professionalism and professional collaboration among schools and their teachers. Without exception, all of the educators and parents we interviewed were enthusiastic about AISI, and the way that it energized the profession. Schools have changed as a result of AISI's work to provide more time and support for professional development, and to increase dedication to collaborative decision-making involving a wider range of participants. If there is any single area in which AISI is most advancing policy changes at the provincial level and throughout the wider culture of education, it is in this crucial domain of collective learning, connectivity among schools, and overall enhancement of capacity.

Along with changes in teaching have come shifts in how leadership is developed in schools. Leadership is no longer confined to the principal's or superintendent's office but is increasingly being spread throughout the professional community, where it retains a close connection to classroom learning. This is a significant, inspiring and world-leading aspect of the changing culture of education in Alberta, at time when teacher leadership is little more than a cliché in most other jurisdictions.

There remain three ways in which AISI does not yet seem to have influenced the wider culture of education and educational change in Alberta. The first concerns the existence of prior and parallel cultures of hierarchical leadership and administration in a number of districts. The second is related to the central administration of Alberta Education and its impact on school and district cultures. The final limitation relates to the need for extension of networking activities across districts to promote optimal learning among educators.

AISI initiatives and the ways in which they are developed are often absorbed into the existing cultures of administration within school districts, which they, in turn, seem to amplify. Districts organized on hierarchical lines with a narrative of management tend to decide on and impose a focus, invest in external packages and trainers, use resources to put coordinators into the district office thereby swelling the ranks of administration, and create little independent connectivity among schools. Lines of control are top-down, implementing administratively selected initiatives and making it difficult for schools to learn from each other. Districts with an ethic or narrative of service provide more trust, invest more heavily in relationships, and secure commitment to common goals, but patterns of implementation are still paternalistic, and staff overload is heavy. This restricts the opportunities for organizational learning.

Some of the educators interviewed in the 15 districts studied in the two qualitative components of the multiple perspectives review communicated that Alberta Education is not perceived as being part of a wider learning community. So far, AISI's flexible, adaptable, participatory and networked approach with its broad conception of learning has interrupted this perception, but more as a refreshing alternative to larger transactional approaches that leave educators wary of other government initiatives.

The transactional model of Alberta Education is not unusual and seems to operate like most other education ministries. It is perceived by AISI participants as a system of central policy development that is then implemented through the hierarchical authority of individual superintendents and line-managed by principals below them. This system is often well organized to implement common programs and strategies. It is less suited to innovation and to developing practices that require local discretion. On the ground, AISI is in tension with the existing policy culture. But as AISI progresses further and policy goals also begin to incorporate more innovative elements suited to knowledge economy goals, this tension could become a creative and energizing one of productive disturbance.

Within schools, AISI appears to be eradicating the longstanding presence of privacy in the culture of teaching. PLCs among teachers and administrators have been established to study the real and most daunting problems as well as the most inspiring and innovative challenges facing schools and then to develop new strategies for responding to them. These are not just individual teacher opportunities but collective professional responsibilities. This is an enormous achievement that has eluded educational reformers in many other jurisdictions around the world.

The greater challenge of privacy and isolation that classroom teachers have experienced in the past is now a different one. It is the privacy and isolation that insulates and separates school districts. This inhibits the potential for learning across schools and projects independently of detailed district control. While some districts have been able to surmount these problems, systemic decisions now have to be made on behalf of teachers and learners in the others:

> ***Is AISI essentially going to an outlier to or even a safety valve for a relatively traditional provincial system of education?***
>
> ***Or, in a context of the province's reinvention as a competitive and innovative knowledge economy within an increasingly diverse community, can AISI now be the catalyst for a more participatory and decentralized process of policy development?***
>
> ***In other words, can AISI create a renewed and reinvented relationship between the central ministry and its districts as well as among the districts themselves?***

By challenging districts to innovate, demanding accountability, and infusing a level of uncertainty around the maintenance of funding, AISI already provides a source of productive disruption of business-as-usual in districts. It capitalizes on local ingenuity and inventiveness and empowers educators to explore new strategies for engaging reluctant learners. It is unlikely that this innovation and creativity would occur without AISI. Increased support for school networking across districts will spread and accelerate these processes.

Recommendations

AISI's change architecture, theory of action, and sensitivity to issues impacting Alberta's diverse schools are unusually sophisticated and responsive. Yet even the best change initiatives can be strengthened. This brings us to our recommendations:

1. *develop* improved ways of collecting and compiling provincial achievement data that will make it possible to trace the impact of complex but distinct initiatives like AISI;

2. *create* leadership and support systems for teachers and administrators involved in AISI projects to access existing data bases, request and receive data analysis services, and design their own instruments and indicators of accountability that are appropriate to their project goals;

3. *extend* AISI project content and processes towards greater involvement of parents, community members, businesses, universities and other partners;

4. *increase* AISI's attention to and impact regarding innovation and improvement in high schools, with particular reference to increasing Alberta's relatively low rates of high school completion;

5. *invest* in province-wide networks that cut across districts, that reach beyond annual conferences and that incorporate proven design principles of effective network architectures that have clear, positive impacts on system-wide outcomes for students;

6. *develop* leadership skill and capacity among *all* principals and district-level leaders so that the effectiveness of AISI projects does not suffer when existing leadership capacity in particular schools and districts is not strong;

7. *embed* AISI into Alberta Education as an integrated policy strategy. Do this without diminishing the attention, resources, advocacy and professional development regarding the distinctive approaches to professionally driven, locally adaptable and laterally networked processes of improvement and innovation that AISI has championed.

These seven recommendations are clustered into six broad and interconnected thematic areas that warrant attention for the further success of AISI in coming years:

1. *Preservation*
2. *Purpose and focus*
3. *Impact*
4. *Culture*
5. *Structure and funding*
6. *Leadership*

1. *Preservation.* The research team finds much that is of value in AISI. Educators consistently state that AISI is making tremendous contributions to the advancement of the teaching profession by giving educators new sets of skills for understanding student learning and assessment practices. Within districts, educators appreciate the opportunity to learn from their colleagues in other schools, and venues such as annual AISI conferences enable educators to meet and exchange their learning with others from throughout the province. This culture of inquiry and exchange then emboldens educators to explore new ideas that they can adapt to local circumstances to better serve their students and their communities. Whatever changes might be made to AISI in the future, these should ensure the *preservation* of these praiseworthy principles and their accompanying strategies.

2. *Purpose and focus.* AISI's positive benefits are significant. They can be used to contribute to the honing of AISI's *purpose and focus*. At the start of its second decade, AISI acknowledges that it no longer is an initiative but a strategy that has proven its value and become an anchor of the province's school improvement efforts. A more systemic focus on areas that proved difficult for AISI in its first ten years—such as high school improvement or increased parent and community engagement in schools—is now warranted. More explicit emphasis on innovation and sustainability, with particular reference to 21st century learning, may also be of value. These latter themes are already present in AISI Cycle 4's recommendations. They merit even greater emphasis in the second decade and overall future of AISI.

3. *Impact.* AISI is a school improvement strategy, not an experimental or quasi-experimental research design. Nonetheless, accountability and improvement arguments make it prudent to develop systemic support that could enable in-school inquiry and systemic evaluation to make more efficient and effective use of data to better measure AISI's *impact.* The research team therefore recommends that AISI establish an AISI Institute of Data (AID) to collect, compile, and compute data related to individual students, schools, and districts for use by policy makers and AISI projects alike. The team also recommends that AID also provides customized support for schools and projects to select and align impact data in relation to project goals.

4. *Culture.* AISI's *culture* is dynamic, intellectually rigorous and sustainable Educators were consistently appreciative of a policy of innovation that genuinely enhanced teaching and learning in a manner that respected their insights and promoted their continual professional growth. At the same time, AISI's culture could be enriched further if AISI is even more proactive about building lateral learning networks across as well as within districts. AISI educators have established a positive culture of sharing practices and celebrating successes but they might also benefit from a more challenging culture of frank acknowledgment of stalled innovations, flat achievement results or differences among schools in making progress. One of the challenges for AISI is not only to amplify district cultures but also to challenge and change them where appropriate.

5. *Structure and funding.* AISI can be enhanced by rethinking its *structure and funding strategy*. A number of schools and districts would welcome a more flexible funding and proposal cycle, with the possibility of proposals that extend beyond the usual three-year limit. This could enable districts to go deeper into especially challenging areas without the uncertainty and need for premature closure that is sometimes built into three-year ceilings on grant-funded projects. Districts and projects can be supported through targeted funding to network with one another in more sustained ways. If funded, the AISI Institute for Data (AID) could help to gauge the benefits of longer and more flexible projects versus those that are more limited in scope and duration.

6. *Leadership.* Like many change strategies, AISI generally has assigned leadership a secondary status in its theory of action. AISI tends to amplify existing leadership cultures without an explicit acknowledgment that they may be more or less capable of supporting AISI activities. For instance, teacher leadership in AISI has been encouraged as a fundamental principle and favored strategy but without concomitant attention to its implications for leadership by principals, superintendents, and other district staff. Yet the research literature indicates that for teacher leadership to be developed in a long-term, sustainable way, ongoing technical support is crucial for principals, superintendents, and district-level staff.

Several school districts have used AISI funds to develop PLCs not only for teachers but also for administrators. These are helping administrators to identify areas in which they can help teachers to grow professionally and especially as instructional leaders. This work appears to be especially valuable in improving the quality of instruction at the high school level. Enriching such administrative PLCs by extending them in networks across district lines and enabling them to benefit from the challenges as well as support of colleagues in other districts is a natural extension of the advantages of networks for teachers' ongoing professional development. Effective networking does not come naturally though, and developing skills of network leadership should be a priority in the future.

Conclusion

AISI is an impressive change strategy that is perhaps without parallel in the world today. It contributes to teacher development and educational change in a manner that is stable, steady, and credible among the educators it most seeks to impact. AISI leadership is transparent, responsive, and trustworthy.

AISI has built a solid foundation to further evolve and address some of the most tenacious problems in educational change today. In the years ahead, AISI leaders should build upon their many accomplishments and expand the most important themes and strategies of AISI into new arenas. AISI should further promote learning across district lines and should increase parents and community engagement in schools. More concerted efforts and sustained support need to be provided to high schools to engage students and to transform learning. In general, more flexible and also more targeted approaches to funding and funding cycles may help achieve these goals.

AISI is already promoting some of these changes in its new cycle of projects. It is imperative that AISI act decisively and boldly in leading the changes. AISI has a unique change architecture. It treats the learning of students, teachers and organizations not as a line, or even a circle, but as a complex, interlocking mosaic. AISI is a complex model of improvement and innovation and also a transparent and participatory one. This is why it enjoys increasing visibility not only in Alberta or Canada but also among policy makers in other nations. AISI's continued progress within one of the world's very highest performing systems will be keenly observed by scholars of educational change and policy makers focused on improving student learning from around the globe.

Chapter 1: Investigating AISI

By Andy Hargreaves

1. Introduction

On April 29, 2004, former Prime Minister Paul Martin gave an address in Washington in which he favorably compared the metaphor of Canada's bilingual, multicultural mosaic, to that of the common melting pot or stew into which all differences are dissolved in the United States. Despite the criticism that hidden hierarchies persist within this multicultural mosaic and that indeed the very first use of mosaic imagery in a social sense was as a critique of the existence of a vertical mosaic in Canada (Porter, 1965), the metaphor remains appropriately central and essential to Canadian identity. More than this, the mosaic metaphor first emerged in Canada's prairie heartland where it referred to a particular style of architecture.

Learning and learning communities are also well captured by the metaphor of the mosaic, as one author's namesakes already recognized more than a decade ago (D Hargreaves, 1994). Learning and communities of learning are made up of diverse pieces – artistic and scientific, improvised and memorized, acquired individually or cooperatively with others – that, with suitable architectural vision, guidance and design, make up a complex but clear unity of achievement.

The architecture of the decade-old Alberta Initiative for School Improvement (AISI) and indeed of any highly effective educational system such as Alberta's or Finland's (the only jurisdiction that outperforms Alberta on OECD's international PISA tests of educational achievement), in a fast-moving, knowledge-driven world of innovation and creativity, is also best thought of as, at its best, a complex but coherent mosaic. Following futurist Alvin Toffler (1990), it might even be regarded as a *moving mosaic* – a dynamic kaleidoscope of local, school and district-determined improvement and innovation, that has a shifting but clearly definable pattern embodying the creativity, flexibility and adaptability that Toffler advocated.

Sophisticated learning of the kind that encompasses 21st century skills and that is increasingly regarded as necessary for advanced knowledge economies (OECD, 2008) is not a circle or a line. It runs neither in predictable steps nor in orderly cycles. It is a complex system and process – much more like a moving mosaic. This is the essence and the aspiration of AISI at its best. Unlike many other less effective systems, AISI does not operate as a set of controlled interventions, orchestrated in a linear or layered way through levels of implementation from the top. At the same time, as a more complex system, it always has to be watchful of turning into a rubble of unrelated fragments in which no clear or coherent vision of learning can be discerned at all.

AISI stands between the dynamics of free will and determinism – or between what complexity theorists call emergence and design (Capra, 2002). As a complex collection of local pieces of improvement and instruction, brought together to try and form a coherent whole, the success or failure of AISI, as of all deliberately constructed complex systems, resides in its particular principles of architectural design and their resulting effects. Too much design and AISI becomes just another mechanism of top-down implementation. Too much emergence, and innovation as well as improvement efforts can be inconsistent in quality, and lack any kind of collective or system-wide coherence. In complex improvement designs like AISI, architecture is everything.

So what is the architectural design of AISI? How clear and appropriate is its vision? What has been its impact and effects, and how easily are these disentangled from Alberta's other educational initiatives? Are the efforts and impacts of AISI sustainable? And could they be achieved more easily or prudently by other means?

To address these questions, a multiple perspectives review of AISI was commissioned by Alberta Education in 2008. The review was conducted by individuals and teams located in British Columbia, Newfoundland, Boston in the United States, and Finland. It encompassed methods of investigation and inquiry that included quantitative analysis of existing data sets, qualitative case studies of schools and districts, and comparative analysis in relation to other reform and improvement strategies elsewhere and over time. The review was conducted between May-August 2009.

This chapter of this multiple perspectives review describes the nature of AISI and the background to the conduct of this review. It states the questions addressed by the review and introduces the sub-components of the review that follow in the ensuing chapters. Following chapters on each of the sub-components of the review, the report closes by presenting the overall findings along with a set of recommendations for the future of AISI.

2. A Brief Description of AISI

The nature of and background to AISI are described by Alberta Education in the following terms:

> The Alberta Initiative for School Improvement (AISI) is a bold approach to improving student learning by encouraging teachers, parents, and the community to work collaboratively to introduce innovative projects that address local needs. Initiated in 1999 by the Alberta Government and its partners, AISI provides targeted funding to school authorities to improve student learning and enhance student engagement and performance. More than $500 million[1] has been invested in this initiative to continuously improve student learning in Alberta. After three successful three-year cycles of the Alberta Initiative for School Improvement (2000-2009), AISI is now in its fourth cycle, 2009-2012 (AISI Education Partners, 2008, p. i).

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[1] At the time of printing this report the amount is now $625 million.

AISI was first initiated a decade ago as a result of the combined efforts and commitments of Alberta Education and its partners: the Alberta Teachers' Association (ATA), Alberta School Boards Association (ASBA), Alberta School Councils' Association (ASCA), Association of School Business Officials of Alberta (ASBOA), and the College of Alberta School Superintendents (CASS); in 2000, the University Faculties of Education joined the partnership.

In AISI, participating school authorities (public, separate, Francophone, charter and private), propose and then, if criteria set by the AISI partners are met, receive resources for self-designed projects that focus on improving student learning, engagement and performance in ways that suit local circumstances. Projects have a wide array of emphases, though in each particular cycle there is a tendency for a substantial proportion (up to 40%) to cluster around one particular theme like differentiated instruction, professional learning communities, or assessment for learning.

AISI has been organized in three-year cycles. At the same time, there is increasing encouragement for projects to build on prior ones where appropriate. Projects may be one, two, or three years in duration and there is an expectation that what has been learned will be integrated and built upon. Each cycle tends to have a particular emphasis or "feel" with Cycle 1 being characterized by a great diversity of local projects, Cycles 2 and 3 being defined by greater efforts to create coherence among projects, especially at the district level, and the new Cycle 4 placing particular stress on engaging students, building leadership capacity within districts, and networking of schools and projects across them.

Administration of AISI within districts and other school authorities, and ways of achieving cohesion among projects within districts do not follow one pattern, as Sumara and Davis' chapter illustrates in its comparison of three different districts. Across the province, projects are connected in annual conferences and in other occasional province-wide meetings and events, as well as by activity on the AISI website.

AISI is funded at around $70-75 million per annum and involves more than 95% of the province's schools in self-designed and initiated innovation and improvement projects. This comprises about 2% of the province's operating education budget. About 1,700 projects have been funded so far.

AISI places great emphasis on professional learning and inquiry as a central element of improvement, and on thorough procedures of accountability that include narrative accounts of intended goals, plans, activities undertaken, lessons learned and indicators of impact. Impact indicators commonly include readily available provincial instruments such as provincial achievement tests (PATs), as well as survey instruments of satisfaction levels etc. They can and sometimes also do entail self-designed instruments and standardized assessments.

The activities and impacts of AISI have already been extensively documented. All cycles are subject to careful and rigorous evaluation (e.g., AISI, 2004, 2008). Provincial Reports such as these evaluations also include detailed discussions of AISI's origins, evolution, implementation strategies and assessment. Recent reports by Alberta Education (2009a, 2009b) have also disseminated AISI project themes on a range of topics. In addition, aspects of AISI have been studied by university researchers. Subjects that have been investigated include high school completion (Gunn, Chorney, & Poulsen, 2008), leadership and sustainability (Foster, Wright, & McRae, 2008), the role of parents and community in supporting student success (Steinmann, Malcolm, Connell, Davis & McMann, 2009), and First Nations, Métis, and Inuit learners (Gunn, Pomahac, Striker, & Tailfeathers, 2009).

In international terms, AISI is an extremely unusual system-wide change strategy that is attracting increasing attention worldwide because of its distinctive differences from other reform strategies in what is an exceptionally high performing educational system. Its commitment to school-based and district-based initiatives with targeted funding includes almost all the schools in the province in a concerted effort at systemic change. It encourages local initiative and expresses high degrees of professional trust within what are nonetheless some of the most stringent systems of external accountability and achievement testing in the nation and the world. AISI is an enigma of change. The purpose of this report is to investigate this enigma – to make its architecture and its impact explicit, with a view to making judgments about its success so far and recommendations regarding its future.

3. The Multiple Perspectives Review

In October 2008, as AISI prepared for its fourth Cycle and tenth year of operation, the Alberta Initiative for School Improvement held a province-wide Colloquium to take stock of the progress of AISI to date, and to help set directions for the future. Involving key stakeholders, AISI Education Partners and staff from the School Improvement Branch of Alberta Education in which AISI is administered, and school jurisdiction presenters of a number of AISI projects, the Colloquium established a characteristically open and transparent process of dialogue and reflection about AISI's strengths and limitations, and about the small and large adjustments that may be needed in reshaping its future.

AISI invited to the Colloquium several researchers who acted as critical friends for the initiative. They participated in dialogue, observed AISI presentations, interacted with stakeholders, and responded to a range of the extensive documentation on AISI and evaluations of AISI that had been produced to date. Robert Crocker, formerly of Memorial University in Newfoundland, contributed his considerable expertise in experimental and survey design as well as statistical meta-analysis of existing data sets to raise issues regarding the measurement of AISI's impact. Dennis Sumara and Brent Davis, then at the University of British Columbia, presented their field-leading work on complexity theory and its uses in education, and provided initial feedback on how AISI may or may not be operating as a complex system. Andy Hargreaves, formerly of the Ontario Institute for Studies in Education and now at Boston College, offered some initial observations on AISI's architecture as a change strategy and its similarity to and difference from other systemic change strategies. Finally, Pasi Sahlberg, Director of the Centre for International Cooperation and Mobility in Finland, provided his observations from an international policy perspective.

Following the Colloquium, these contributors were invited to undertake deeper research with a slightly widened team that would comprise a multiple perspectives review on the design, impact and future of AISI, including its sustainability. Sixteen research questions were finalized in February and March 2009 through a process of consensus by the research team and Alberta Education. Five of these were overarching questions:

1. What is the distinctive theory-in-action (change architecture) of AISI?
2. What is the value of AISI? (What are the values of AISI?)
3. Is it possible for jurisdictions to do these projects and activities without AISI?
4. Would the values of AISI continue without funding?
5. Has AISI changed the culture of education in Alberta? If so, how has it?

These were supplemented by eleven subsidiary questions:

1. What have been the successes of AISI, as assessed from multiple perspectives?
2. What are both the obvious and the subtle impacts of AISI?
3. How is AISI lived and practiced by educators?
4. What are the change processes at play for administrators and teachers?
5. What have been the difficulties and challenges of AISI?
6. Has AISI encouraged school authorities to try new things?
7. Has AISI encouraged those involved to take risks and to be more innovative?
8. What are the opportunities to expand the measures of AISI projects from the vantage point of complexity theory?
9. What are the opportunities to disseminate knowledge generated by AISI by using its networks and complexity thinking? Have these opportunities been used to promote change across AISI jurisdictions?
10. How has AISI influenced policy developments at the school, jurisdictional, and provincial levels?
11. What are the implications of the research findings for AISI as a work in progress?

Andy Hargreaves served as overall project coordinator for three research teams and a critical friend who was also appointed to the project.

The first research component was conducted by Robert Crocker. This took the form of a meta-analysis of existing provincial data sets concerning tested achievement results, as well as survey data of satisfaction levels for parents, students and teachers, in relation to the effects of AISI. This study conducted further analysis of data from AISI Cycle 2 and preliminary analysis of Cycle 3 data to try and ascertain whether there were observable changes over time and across main AISI themes and strategies, the extent to which these changes could be attributed to AISI, and whether some AISI themes and/or strategies were more effective than others in relation to valued outcomes. In addition, this study and the chapter arising from it, evaluates the suitability of existing data sets and data gathering processes for determining the impact of AISI and makes suggestions for future improvement in subsequent cycles. This component of the project is reported in the next chapter.

Chapter 3 reports the results of a second component of this multiple perspectives review that responds to four questions originally posed in October 2008 by Alberta's Deputy Minister of Education, Keray Henke:

1. What is the value of the AISI?
2. Why couldn't jurisdictions do this anyway?
3. Would the values of AISI continue without funding?
4. Has AISI changed the culture of education in Alberta? If so, how?

Dennis Sumara and Brent Davis bring an understanding of complexity theory to these questions to study how AISI has affected educational cultures within different school districts and whether any identified benefits might be sustainable. Their analysis and the insights from it are sharpened by a qualitative interpretation of AISI design and development in relation to the prior patterns of culture and leadership that existed and persist in three strikingly contrasting districts.

In Chapter 4, Dennis Shirley and Lori McEwen present their qualitative condensed case study of 12 varied and geographically dispersed school districts. This study employed interviews and focus group discussions as well as analysis of school, district and project documents, to gather data about the meaning and value of AISI among educators and district personnel involved in and responsible for design, implementation, and assessment of AISI activities at the district level. This up-close view of AISI on the ground provides evidence of the perceived architecture, impact, strengths and challenges of AISI as well as the context in which AISI operates among those who are most closely engaged with it.

Chapters 5 and 6 draw on the findings and evidence of the three preceding chapters and compare the architecture and impact of AISI to other reform strategies over time and in other places. Andy Hargreaves compares AISI to four ways of change that have characterized educational change over the last half-century and reflects on these to make judgments about the strengths, limitations and future possibilities for AISI. Pasi Sahlberg refers to his extensive knowledge of other reform examples in Finland and across the world to determine the distinctiveness of AISI and also delineate its best possible ways forward.

Finally, Chapter 7 and Chapter 8 draw together all the key findings across the sectors as well as some recommendations arising from them. These are not just a collation of the results of the separate sub-components of the review, but the product of intense discussion and analysis in a three-day retreat for all the teams in August 2009, after the first drafts of their reports had been prepared.

4. Conclusion

This review is especially timely. It has been commissioned ten years into one of the most remarkable and enigmatic approaches to school improvement and innovation on a system-wide basis in the world. AISI involves a substantial sum of provincial expenditure, and especially at a time of economic downturn it is important to review what AISI is and might be, what it has achieved and might achieve in the future, and what elements of orientation and design may need to be reconsidered and reconstructed.

Beyond Alberta, as new questions are being raised about what young people need to be able to learn in a context of great economic and social reconstruction, AISI is attracting considerable global attention as a distinctive, even unique approach to educational change. An assessment of how it works and what it is worth is therefore especially opportune at this moment. Alberta is a world leader in educational standards. AISI is internationally on the leading edge of approaches to innovation and improvement. This is a review from which many might benefit, inside and outside the province. The learning mosaic is now a global mosaic. Having designed, conducted, coordinated and presented this review in approximately six months, the multiple perspectives team hopes that its efforts and insights will prove helpful to the province and to all who care about developing better improvement strategies for the learning of our young people in the 21st century.

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Chapter 2: Rethinking the AISI Research Model: Secondary Data Analysis and Future Applications

By Robert Crocker

1. Introduction

1.1 Purpose

This study had two main purposes. The first was to conduct further analysis of data from AISI Cycle 2 and preliminary analysis of Cycle 3 data. More specifically, the goal was to address the following three questions:

1. Are there observable changes over time and across main AISI themes and strategies?
2. To what extent can these changes be attributed to AISI rather than to extraneous factors?
3. Are some AISI themes and/or strategies more effective than others in bringing about gains in valued outcomes?

The second purpose was to review the quantitative analysis model and data gathering processes of the Alberta Initiative for School Improvement (AISI) and make suggestions for enhancing the model and the quality of data in subsequent cycles. More specific questions under this purpose are:

1. Do alternative approaches to analysis exist that might shed further light on AISI project impacts?
2. Can these alternatives be effectively applied to the existing data base, specifically for Cycle 2 and the first two years of Cycle 3, in ways that would add value beyond the existing reports and improve the analysis in subsequent cycles?
3. Can the AISI research model be modified for Cycle 4 in ways that can reduce some of the limitations of existing research designs?
4. Can existing data bases be used to investigate provincial impacts?
5. What new data might be useful to enhance the analytical capability in future cycles?
6. What are the broader challenges in determining the value of AISI to the performance of the system as a whole and how can these be overcome?

1.2 Background

Even though individual AISI projects are locally initiated and are designed to address a wide variety of issues, a common goal of improved student learning pervades the program (AISI Cycle 3 Handbook, p. 1). This is most evident in the fact that almost all projects have used measures of student learning as outcomes. Baseline, target and actual outcomes have been measured and reported for all projects. The most commonly used measures are the results on provincial tests, either the Provincial Achievement Tests (PATs) or the Diploma Examinations. Many projects also use locally determined achievement measures, including standardized tests and teacher-developed measures. Additional measures include surveys of teacher, student and parent satisfaction. However, these are somewhat less common and are typically used in conjunction with student achievement measures. Since the PAT and Diploma Exam results are most pervasive and are the only measures that can be directly compared across projects and project types, these form the main focus of this report.

A major issue arising from the analytical work to date is the impact of AISI on the school system in Alberta as a whole. An argument can be made that an initiative of the scope of AISI (a substantial investment of funds in many projects over a long time) should be expected to yield some impact on the results of provincial, and possibly national and international assessments.[2] The validity of that argument and the question of how any such impacts might be identified will be examined as a final component of this project.

1.3 The AISI Research Design

One way to view AISI is as a large group of action research projects on school improvement. Each project sets its own target outcomes and determines what it wishes to do to improve these outcomes. However, it is clear from much of the work already done that an expectation exists for provincial impact, and, among some stakeholders, for impact on provincial achievement measures. This leads to an alternative view of AISI, based more directly on quantitative research methods and design principles. From this perspective, AISI can be thought of as a large series of quasi-experiments, with student learning, achievement and other performance indicators as dependent variables (outcomes) and the various project interventions as independent variables (or treatments). The goal is to examine the impact of the interventions on the outcomes and to determine which kinds of interventions yield results that are generalizable to a larger population.

Under the classic quantitative and experimental design model, determining the impact of an intervention requires, first, that an impact be established and, second, that the impact can be attributed to the treatment rather than to extraneous sources. This leads to the key requirement that sources of influence on the outcome, other than the intervention itself (usually called extraneous variables), be controlled. In "true experiments", control is usually exercised by the use of random assignment of participants (in this case mainly students and teachers) to treatment and control groups and comparing the changes in outcomes over time for the two (or more) groups. This is often referred to as the randomized clinical trial[3]. The key design point is not that extraneous variables are eliminated but that randomization allows these variables to have the same influence on both groups over the treatment period, so that any differences between the groups at the end may be attributable to the treatment.

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[2] It is important to note that Alberta students have historically performed extremely well on national and international assessments. That was true before the AISI period and remains true today. Because school level data are not available on such assessments, it is not possible to examine any impact of AISI on performance on these assessments.

Although the true experiment is regarded by many as the "gold standard" for determining if a treatment is effective, in practice, very few large scale interventions in school systems meet the design requirements of an experiment. The AISI design, which employs measures of change over time, but no explicitly defined control group, is more typical. Under such a design, changes over time can be measured but these changes cannot be attributed directly or exclusively to the intervention because other events occurring over the same time may also influence the outcome. The quasi-experimental nature of the design arises because the intent is the same as a true experiment. However, some of the conditions of a true experimental design are met while others are not.

1.4 Analytical Approaches Used in Quasi-Experimental Designs

Under a quasi-experimental design, especially when a large number of projects are available, several analytical approaches may be used to help test the hypothesis that outcomes may be attributed to treatments. The main alternatives are:

- statistical control
- replication
- time series analysis (including baseline comparisons)
- differentiation

Statistical Control. To apply statistical control, data on as many extraneous variables as possible are collected as part of the study and techniques such as analysis of covariance or regression analysis are used to separate the effects of these variables from the "residual" effect of the treatment. As far as we can tell, this has not been done in the AISI projects and the summary data files available do not include data on any such variables. However, since a baseline measure is available, the baseline can be used as a proxy for the effects of extraneous factors occurring before the treatment was implemented (though not those occurring during the treatment period). This allows a minimal approach to statistical control, which is used in this study.

Replication. Replication involves repeated application of the same treatment. To the extent that repeated applications yield consistent results, the probability that the results are caused by extraneous variables is reduced. Since a large number of

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[3] The term "randomized clinical trial" comes from medical research. The term "randomized field trial" is less commonly used but is closer to what actually happens in educational experiments.

> projects and measures within specific themes are available in AISI, replication becomes a more plausible approach to analysis – although we must still remain cautious that even projects with similar themes may be and sometimes clearly are interpreted and implemented in very different ways as is evident in the cases described in the accompanying chapter by Sumara and Davis. The idea is to look for clusters of similar projects and examine the consistency of results across these similar projects. If these results can also be supplemented by findings from similar studies found elsewhere in the literature, the argument for treatment effects becomes more plausible.

The meta-analytic approach used in existing AISI provincial reports is a good example of an attempt to apply the replication principle. Meta-analysis is simply a way of quantifying the average results over a number of studies. Positive average results (judged by established conventions for effect sizes) yield evidence of a treatment effect that may be thought of as relatively independent of the design differences among specific projects.

Since most projects are repeated over three years, the annual repetitions may also be considered as fairly precise replications since, presumably, the treatment remains largely the same from year to year although even here, with the development of knowledge and understanding about moving from novice to mature professional learning communities, for example, one would expect some variations and even improvements in implementation with successive "treatments" in any one case. Nonetheless, in this study the year by year results will be examined from a replication perspective.

> *Time Series Analysis.* This has several variations, but the underlying principle is to look for discontinuities in trends plotted over time. For example, if student achievement (by whatever measure) is steady for several baseline years, then increases with the application of a treatment, and then returns to its original state after the treatment is withdrawn, this would constitute evidence (though not conclusive evidence) of a treatment effect. Repeated applications and withdrawals of the treatment, with similar discontinuities, would strengthen the case for a treatment effect. A steady increase in achievement before and after a treatment, while desirable, would not constitute evidence of a treatment effect. Indeed, fallacious conclusions are sometimes drawn by averaging achievement for a period before and a period following the treatment.

Originally, it was thought that the relatively long time frame of AISI might yield a basis for time series analysis. However, a review of the data indicates that, while treatments are typically repeated over each year of the three-year cycle, the data are compiled on a year-by-year basis and cannot be tracked cumulatively for the same students over the three years. There is thus no way to create a time series plot of change over the three years. Also, there is no evidence on effects after withdrawal of the treatment, as students have not been followed over subsequent years. Despite the ability to compare baseline and actual results, the AISI design does not lend itself to a true time series analysis.

> *Differentiation.* Differentiation is the complement of replication in the sense that the goal of differentiation is to examine both like and unlike projects designed to meet the same goals. For example, the effects of individualized and group learning strategies on mathematics achievement may ideally be examined by a randomized clinical trial encompassing both treatments, with each acting as a control against the other. In the absence of such a design, each treatment may be applied independently in two or more separate studies. In this case, the two treatments are not applied to the same participants or to different randomly assigned participants but to separate groups that may be more or less equivalent, depending on the selection process.

When differentiation can be combined with replication, the prospects for making valid comparisons improve. For example, if we had three projects, each involving two teaching strategies, each yielding consistent results for the specific intervention, but different results across interventions, then a much stronger inference about the effects of each intervention can be made. The existence of a large number of projects in a program such as AISI, makes it possible to seek replicated examples of differentiated interventions, bearing in mind the cautions surrounding implementation expressed earlier.

2. Provincial Overview

This section gives a brief overview of the types of outcome measures used in AISI and the analytical approach used in the provincial reports. Provincial results for Cycles 1 and 2 are also given. These have been drawn directly from the AISI Provincial Reports. A parallel analysis was conducted for the first two years of Cycle 3 and the results presented in the same way as those in the provincial reports. Results are given for the main measures used. Specifically, these are provincial assessments (PAT and Diploma Exam performance), local assessments (mainly locally administered standardized tests and teacher made tests), student and parent surveys and teacher surveys. Each of these has several sub-sets, which are examined more closely in later sections.

2.1 Statistical Note: Effect Size

The AISI Provincial Reports use as the main indicator of effect the difference between a baseline measure (typically an average for the three years prior to the project) and an actual project result (annual or over three years). The observed difference (for example, the difference between baseline and actual on a particular PAT measure) is converted to a standardized measure called an "effect size."

An effect size is a standardized measure of the effect of an intervention, which permits comparisons across projects with similar treatments but with different measures of outcome. The use of effect sizes rather than the more conventional tests of statistical significance facilitates the comparison of differences across measures based on different scales and different sample sizes. It is also free from one of the major constraints on statistical significance tests, namely that statistical significance is a function of sample size. For interventions with large sample sizes, as is the case for many AISI themes and strategies, even very small differences, which are of little policy importance, can be statistically significant.

Just as conventions exist for judging statistical significance, conventions have been adopted to indicate whether the observed effect is important for purposes of policy or practice. The most common convention is that proposed by Cohen (1988) as follows:

Effect size	**Interpretation**
<.20	no effect
.20-.49	small effect
.50-.79	medium effect
.80 or greater	large effect

AISI uses a slightly different version, which counts non-statistically significant or negative results as no effect (Presumably AISI projects are never designed to have negative effects) and considers effect sizes of .01 to less than .20 as "minimal."

2.2 Overview of Provincial Results

Figure 2.1 shows the provincial results for Cycles 1 and 2, and the first two years of Cycle 3. These are presented to give context for the re-analysis and to allow the differences to be presented in the remainder of this report to be clearly identified and accounted for. This graph also facilitates explanation of the use of effect sizes rather than statistical significance or score differences as the basis for comparison.

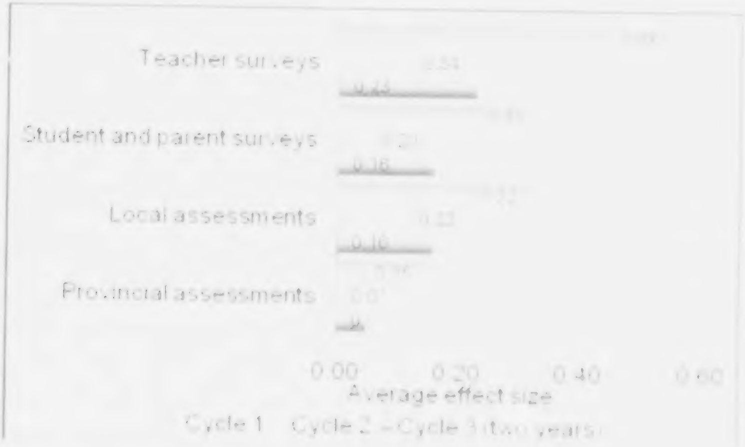

Figure 2.1 Average Effect Sizes for AISI Cycle 1, Cycle 2 and Cycle 3 (first two years)

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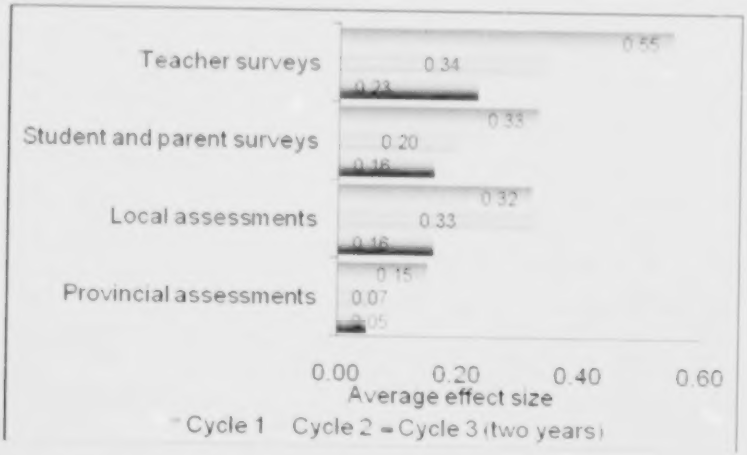

Figure 2.1 Average Effect Sizes for AISI Cycle 1, Cycle 2 and Cycle 3 (first two years)

The effect sizes for all measures other than provincial assessments are mostly in the small range (.20 to .49) by Cohen's definitions. The provincial assessment results show no effect by Cohen's convention and minimal effect by the AISI convention. There is a general decline in effect sizes over the three cycles for all of the surveys, a decline from Cycles 1 and 2 to Cycle 3 for local assessments and a decline from Cycle 1 but essentially no change from Cycle 2 to Cycle 3 for provincial assessments.

The Cycle 2 Provincial Report noted that the smaller effect sizes for provincial measures and larger ones for local assessments are to be expected, as the latter are likely more directly related to what the projects are intended to accomplish. Nevertheless, the provincial assessment results constitute by far the largest single source of data and many projects explicitly identify their goal as increasing performance on these assessments. Provincial assessments are also the only measures that are common across projects. Despite their limitations, this makes these measures more useful than others when attempting to determine provincial effects.

3. Cycles 2 and 3 Themes and Strategies

3.1 Cycle 2

Although AISI projects are highly varied, it is possible to categorize projects into common areas based on subject, type of student served, thematic area, teaching strategy and type of measures used. This has been done by the project proponents themselves, and a classification system has been developed from these categories. This section examines what AISI had called "themes" and "strategies" for the Cycle 2 projects. A parallel analysis for the first two years of Cycle 3 is presented in the next section.

Themes and strategies for which 20 or more projects could be found were selected for analysis. A few combinations of themes were also examined (where ten or more projects could be found for the combination) as a way of investigating the possibility that certain cross-classifications would be more effective than others. For example, some of the more common Cycle 2 project types involved the use of professional learning communities within a particular teaching or learning strategy such as problem solving or cooperative learning. Such combinations were identified and examined separately.

Average effect sizes over the duration of the project for all projects within a theme/strategy were computed. Confidence intervals were then computed across projects within a theme, strategy or combination. A theme, strategy or combination was considered to have a statistically significant effect if the confidence interval around the average effect size did not overlap zero.

Table 2.1 is an attempt to summarize these results by theme, strategy and combination and by the various measures used. The abbreviations "Acc" and "Ex" in the table refer to the percentage of students reaching the Acceptable Standard and the Standard of

Excellence on the Provincial Achievement Tests, the Grade 12 Diploma Exams and Local achievement measures. The "Other" category for local measures refers to results such as the percentage of students meeting grade level expectations, percentage graduating, average standardized test scores and other outcomes. For the survey measures, the average effect sizes were based on percentage response to questionnaire items on satisfaction or similar scales. The use of effect sizes throughout allows comparisons to be made across these diverse measures.

Most of the effect sizes for the two types of PAT measures are quite small. While there are variations across themes, the variability within themes is generally as great as or greater than the effect sizes themselves. This indicates that there is not much consistency among projects within specific themes. Indeed, in only a few cases are the effects of a theme statistically significantly positive, as most of the error ranges overlap the zero point on the scale. No theme effect is consistently positive across both the acceptable standard and the standard of excellence.

Effect sizes for the Diploma Exams are generally larger than those for the PATs and most are statistically significantly positive. Also, the effects are larger for the standard of excellence than for the acceptable standard, although there is considerable variation within themes. What is most interesting about this, however, is the relatively small differences in effect across themes, especially for the standard of excellence. This suggests that something other than the AISI themes is functioning to yield positive results throughout. As later results will indicate, these results reflect a general upward trend in the percentage of students meeting the Standard of Excellence over the Cycle 2 period.

Table 2.1 Statistically Significant Results for Cycle 2 Themes and Strategies by Measure

	Projects	Measures	PAT		Diploma		Local		Parent Survey	Student Survey	Teacher Survey	
Themes			Acc	Ex	Acc	Ex	Acc	Other			Growth	Satisfaction
Differentiated instruction	93	1192			+	+	+			+	+	+
Professional development	70	924			+	+	+	+	+	+	+	+
Professional learning communities	58	913				+	+		+	+	+	+
Assessment	27	332	+			+		+				+
Multiple intelligences	20	324				+		+		+	+	+
Technology integration	20	192				+					+	
Early interventions	22	145				+		+				
Strategies												
Learning styles	58	811				+		+		+	+	+
Experiential learning	41	503	+		+	+			+	+	+	+
Alternative delivery of instruction	38	374	+			+	+	+		+		
Project-based learning	34	487			+	+					+	+
Cooperative learning	34	478	+			+			+	+	+	+
Problem solving	33	488			+	+			+		+	+
Enrichment	32	450				+		+		+	+	+
Small group instruction	30	353			+	+				+	+	
Individualized instruction	31	325			+	+			+	+		
Workshops	26	320	+	+		+			+	+		+
Balanced literacy	26	319			+	+		+	+			
Mentoring	30	317				+		+	+	+	+	+
One on one instruction	27	298			+	+		+		+		
Guest speakers	24	281				+					+	+
Home reading	21	180				+		+				
Combinations												
DI x learning styles	46	652				+		+		+	+	+
DI x project learning	17	336				+					+	
DI x problem solving	13	273			+	+					+	+
DI x cooperative learning	13	233				+						
PLC x learning styles	17	338				+			+			
PLC x cooperative learning	16	279				+						
PLC x problem solving	15	258				+			+	+		+
PLC x project learning	10	216			+	+			+			

Local measures at the acceptable standard are available for a few themes. Four of these – differentiated instruction, professional development, professional learning communities and alternative delivery – show statistically significant effects. Effects are larger and more variable across themes on the "other" standard. However, the detailed results show that effects are generally highly variable within themes. This category of measure encompasses a variety of different standards, so there is little consistency in what this category means, especially across projects. For this and other reasons (such as potential bias in local measures), it is difficult to make a judgment on the meaning of these effects.

Average effects sizes for parent surveys are mostly small (.20 or less according to the detailed results), though many are statistically significant within themes. Some larger effects (in the .20 to .30 range) are apparent for the student surveys. It is worth noting that some themes which might be described as "student centered," such as learning styles, cooperative learning, individualized instruction and mentoring yield among the larger effects as measured by student surveys, even though these do not stand out in the achievement measures.

The table shows many significant positive effects for the teacher growth and teacher satisfaction measures. The detailed results indicate that the largest effects are those for teacher growth. Most of these effects reach the "moderate" level by Cohen's criteria. Relative to the effect sizes, there is also somewhat less variation within themes for teacher growth. There might be some expectation that professional development themes would be particularly attractive to teachers. Indeed, the professional learning community theme does yield one of the highest average effect sizes. However, once the within-theme variation is considered, this theme does not stand out as exceptional.

It is not possible to identify from the detailed results themes that stand out as contributing most or least to teacher growth. The teacher growth effects are essentially all much larger than those for other measure types. This reinforces the earlier point that other factors may be at play. The possibility of a generic effect stemming from the resources made available as well as the attention shown towards teachers and their professional judgment is a strong one here. Although one might expect this to show up in teacher surveys as well as the growth measures, the effects for teacher surveys do not stand out as particularly large.

3.2 Cycle 3

The themes and strategies used in AISI Cycle 3 were quite similar to those found in Cycle 2. In particular, differentiated instruction, professional development and professional learning communities remained major themes. However, there are a few notable differences. Assessment projects were much more common in Cycle 3, with "assessment for learning" being classified as a strategy rather than a theme.[4] There was a slightly greater concentration of projects in Cycle 3, with several areas that were found in Cycle 2 not having sufficient measures in Cycle 3 to meet the selection criteria for this analysis. On the other hand, a few areas, specifically blended structure, individual programming and high school completion were added in Cycle 3.

The Cycle 3 measures also paralleled those in Cycle 2 with one exception. A category labelled "provincial satisfaction measures" was added to allow for the use of a battery of measures administered by the province to measure satisfaction with the school system on the part of various stakeholders, including students, teachers and parents. The different versions of the satisfaction measures were not differentiated in the AISI data base, so only combined results can be reported here.

Table 2.2 shows the summary results for the first two years of Cycle 3. The effects here are consistently somewhat more positive than were found for Cycle 2, especially for the Acceptable Standard. The detailed results again show effect sizes to be quite small (typically <.10 but with some variation).

Results for the Diploma Exams show few statistically significant effects. The general trend, as shown in the detailed results, was towards slightly negative gains. This pattern is quite different from that found in Cycle 2, especially for the standard of excellence, where the results generally have shifted from small positive to no effect over all themes and strategies.

Relatively few results were available for locally developed measures in Cycle 3 and most of those that are available show no significant effect. Again, this is different from what was found in Cycle 2, where most effects were positive.

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[4] Assessment was also classified as a theme in Cycle 3 but this category almost completely overlapped the assessment for learning strategy. The latter was used in the analysis because more projects and measures were identifiable.

Table 2.2 Statistically Significant Results for Cycle 3 Themes and Strategies by Measure

	Projects	Measures	PAT		Diploma		Local		Parent Survey	Student Survey	Teacher Survey		Provincial Satisfaction
			Acc	Ex	Acc	Ex	Acc	Other			Growth	Satisfaction	
Themes													
Differentiated instruction	117	1231	x	x			x	x	x	x		x	x
Professional development	57	684	x	x					x	x		x	x
Professional learning communities	48	528	x							x	x	x	x
High school completion	21	216											
Strategies													
Assessment for learning	134	1577	x				x	x	x	x	x	x	x
Learning styles	60	886	x	x			x			x	x	x	x
Experiential learning	47	470								x		x	x
Project based learning	35	445								x		x	
Balanced literacy	36	432	x								x		
Mentoring	33	427	x						x	x	x	x	x
Workshops	25	367	x	x						x		x	
Cooperative learning	31	355	x	x					x	x	x	x	
Alternative delivery	32	352								x			
Guest speakers	22	278		x					x	x		x	x
Blended structure	21	276	x							x	x		
Problem solving	29	272								x		x	
Small groups	23	269	x	x					x	x			
Individual programming	25	251	x						x				
Combinations													
DI x learning styles	45	731	x	x			x	x		x		x	x
DI x project based learning	19	329							x	x			x
DI x problem solving	14	169											
DI x cooperative learning	15	191	x	x									
PLC x learning styles	13	201	x							x		x	

As before, the results for the student and parent surveys tend to be positive across themes and strategies. However, the detailed results show considerable variation within themes and strategies. Three strategies – mentoring, cooperative learning and small group instruction – stand out in the detailed results as having greater and more consistent effects across the measures than others. All of these also showed significantly positive effects for these same measures in Cycle 2. Differentiated instruction and assessment for learning also show consistent effects across measures. However, this is at least partly an artifact of the large number of projects for each measure, resulting in smaller within-theme errors. All of these also showed significantly positive effects for these same measures in Cycle 2.

The provincial satisfaction surveys formed a distinct measure in Cycle 3. Most of the effect sizes available for this measure are marginally positive indicating that satisfaction with the system as a whole was increasing.

3.3 Cycle 2 and Cycle 3 Summary

The picture for Cycle 2 and 3 effects by theme/strategy and measure is complex and difficult to summarize in a concise way. What is clear is that the effects within particular themes or strategies are not highly consistent. There is somewhat greater consistency within measures across themes and strategies. However, that is not particularly helpful in determining whether some themes or strategies are more effective than others.

One way to create a concise summary is to look for effects that are consistently positive over the two cycles. This can be made more explicit by setting some effect size criterion and determining whether this criterion is met for themes and strategies within measures. In this case, a relatively liberal criterion was adopted, based on the idea that the mean effect size for a particular theme/strategy and measure can be considered statistically significant if its confidence interval, as represented by the error bars on the graphs, does not overlap zero for either cycle.

Table 2.3 shows these consistent effects. It is again evident that the surveys yield the most significant effects, further reinforcing the point that the results are more measure-specific than theme/strategy specific. However, under this criterion, four areas – professional development, assessment, cooperative learning and workshops – show significant PAT effects. Professional development and workshops overlap by about 40%, so these should not be considered as independent effects.

Table 2.3 Consistent Mean Effect Sizes by Theme/Strategy and Measure, Cycles 2 and 3

		PAT Acc	PAT Ex	DE Acc	DE Ex	Local Acc	Local Other	Parent Survey	Student Survey	Teacher Growth	Teacher Satisfaction
Themes	Differentiated instruction					S			S		
	Professional development	S						S	S		
	Professional learning communities								S	S	
000	Assessment	S					S				
Strategies	Learning styles								S	S	
	Experiential learning							S	S		
	Problem solving							S			
	Cooperative learning	S						S	S	S	
	Alternate delivery								S		
	Small group instruction								S		
	Balanced literacy							S			
	Mentoring							S	S	S	
	Workshops	S							S		
Combination	Differentiated instruction x learning styles						S		S		

4. Correlational and Multivariate Analysis

4.1 Correlations Over Time

Most Cycle 2 projects were repeated in each of the three years of the cycle, while two repetitions were available for Cycle 3. One simple way to test whether the results for particular projects are consistent over time is to correlate the results over the years for which a particular project is repeated. In summary correlations were found to be consistently positive, as expected, and that their magnitudes were relatively large. Since correlation coefficients may be interpreted directly as effect sizes, by Cohen's criteria most of the effects were at least medium and many were large. This supports the view that, despite maturations in understanding and in approaches to implementation, it is still reasonable to treat repetitions of a project over time as replications.

4.2 Correlations of Outcomes with Baseline

Correlations of the AISI outcomes with the baseline measures yielded the expected result with correlations averaging more than .80. This may be taken as an indication that the measures are highly reliable and that AISI projects are no exception to the general pattern in pretest/posttest studies where previous behaviour is typically the strongest predictor of later behaviour. What is more important, however, is that the correlations between baseline and effect sizes were generally negative. This suggests that the results may be subject to what is known as statistical regression. In effect, this means that projects applied to students with lower baseline scores are likely to yield positive effects while those with higher baseline results are likely to yield negative effects.[5] When a measure is repeated (as in comparing baseline to later outcome), the regression effect results, on average, in an increase in the scores at the lower end of the distribution and a decrease in those at the higher end. This is unrelated to any treatment effect but may be confounded with the treatment effect, especially when looking at results that are particularly strongly positive or negative.

A second effect, which seems related to regression but differs in principle, is what is known as a "ceiling effect". In common sense terms, this relates to the expectation that it would more difficult to achieve gains for students who are already at the high end of the achievement scale than for those at the lower end. There is a link between regression and the ceiling effect in that both can serve to reduce outcome scores at the high end and increase them at the low end. However, these effects are not logically related. All other things being equal, the regression effect will actually reduce outcome values for those at the high end whereas the ceiling effect will more likely result in smaller gains but not actual reduction.

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[5] A commonly used illustration of statistical regression is the height of children relative to their parents. Children of tall parents will tend to be tall because of heredity but will tend to be shorter than their parents because of other factors affecting parents' height which are not present in the offspring. The opposite is true for the children of shorter parents. The same phenomenon applies to any quasi-experiment where subjects are selected from the high or low ends of the baseline distribution and the change over time is measured.

In order to examine this point more closely, the distributions of baselines by project and measure were divided into five equal groups, or quintiles. The mean effect sizes were then computed for each quintile. These results may be summarized as follows:

- The general pattern was one of positive effects for low baseline projects and zero or negative effects for high baseline projects.
- The results for the PATs and the Diploma Exams were essentially symmetrical, with the positives for low baseline projects being mostly offset by negatives for the high baseline projects. This is consistent with the small overall effects for these measures, and suggests that the treatment effect is too small to be detected, once the regression effect is taken into account.
- For the survey measures, almost all of the effects, for both high and low baseline projects were positive, suggesting a treatment effect that is independent of the regression effect. However, the pattern of higher effects for low than for high baseline projects was as pronounced for the surveys as for the achievement measures.

Even though these results point to the likelihood that regression effects are strong contributors to the results, it is not a simple matter, under a quasi-experimental design, to separate the treatment from the regression effects[6] or the regression from the ceiling effect. The fact that the average effect remains positive for most measures, and that the low and high quintile results are not generally symmetrical, indicates that something other than regression is at play. Also, an argument can be made that higher gains on the part of those with the lowest starting point is a desirable outcome in any event. However, this is not particularly useful when the goal is to separate treatment effects from regression effects.

4.3 A Multiple Regression Model

As mentioned earlier, statistical techniques may sometimes be used to control for extraneous variables that may be confounded with the treatment effects. The possibilities for using statistical controls on the AISI data are limited because the data base does not include background information on the schools, teachers and students taking part in the projects. However, a model can be developed in which the baseline values are used as a proxy for all of the possible external effects which may exist. The assumption here is that student demographic and socioeconomic backgrounds, school characteristics, teaching strategies, and other pre-treatment factors that might affect the outcome are embodied in the baseline. Controlling for the baseline also controls for both the regression and ceiling effects. While this is, at best, a rough approximation, a model which controls for the baseline can help shed some light on the extent to which treatments have an effect independent of many extraneous background factors.

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[6] In a true experiment, the regression effect is not eliminated but is controlled by virtue of random assignment of participants to the treatments. That is, this effect appears about equally in the treatment and control groups.

Two models, one with effect size as the outcome and one with the mean actual score, were run for each measure for which sufficient data were available. The results may be summarized as follows:

- As expected, the baseline is a strong positive predictor of the actual outcome. Those who start at a high baseline tend to remain high and vice versa for those who start low, regardless of any other effects.
- The baseline is generally a strong negative predictor of the effect size. This again offers evidence of ceiling effects and/or regression effects.

The important question is whether any of the themes or strategies show effects that remain positive after controlling for the baseline. Taking the results over the two types of outcomes and the two cycles shows that many of the effects that were positive in the initial analysis become negative once the baseline is controlled. This suggests that some of the observed effects for particular measures are artifacts of the baselines for projects involving these treatments.

A few themes and strategies were found to be significant predictors of both effect size and actual outcome within a cycle. These effects are summarized in Table 2.4. With baseline controlled, it is more plausible to consider these as treatment effects. Most of these effects are, however, measure-specific. Also, none shows a consistent effect across the two cycles.

Table 2.4 Consistent Theme and Strategy Effects for Effect Size and Actual Outcomes by Measure

Measure	Cycle 2	Cycle 3
PAT acceptable	Technology integration (+)	Small groups (+) Professional development (+) Professional learning communities (+)
PAT excellence	Early intervention (-)	Small groups (+) Professional development (+) Professional learning communities (+)
DE Acceptable		Learning styles (-) High school completion (-)
DE Excellence		
Local achievement measures acceptable	One on one (-) Problem solving (-) Cooperative learning (-) Balanced literacy (-) Workshops (+)	Learning styles (+)
Local measures "other"	PLC (-) Cooperative learning (-) Mentoring (+)	
Parent survey	Alternative delivery (-)	Mentoring (+)
Student survey	Problem solving (-) Assessment (-) Cooperative learning (+)	Mentoring (+)
Teacher growth		Differentiated instruction (-)
Teacher satisfaction	Alternative delivery (-) Problem solving (-) One on one (-)	High school completion (-)

5. AISI Results Relative to Provincial Trends

One issue that has arisen in discussion of the small effect sizes for provincial measures is whether provincial averages have changed over time and whether it is desirable (or even possible) to adjust the AISI results for any such change. This section addresses this issue for the PATs, for which provincial average results are available.

5.1 PAT Provincial Overview

PAT provincial results over all grades (3, 6 and 9) and subjects (language arts, mathematics, science and social studies) are based on detailed analyses and may be summarized as follows:

- There was slight growth in provincial average performance on both standards during the Cycle 2 baseline period from 2001 to 2003.
- The provincial averages were quite stable over the Cycle 2 years, 2004 to 2006.
- Taking 2004 to 2006 as the baseline for Cycle 3, the provincial average for the acceptable standard declined in the Cycle 3 years, while the average for the standard of excellence increased slightly.[7] This suggests greater variability of results in these years.

5.2 AISI Averages Compared to Provincial Averages

The main question of interest is whether the AISI results follow the same pattern as the provincial results. It is difficult to determine this for the overall results across all PAT measures because the mix of subjects and grades in AISI is not the same as that for the province as a whole. For that reason, the analysis was conducted by subject and grade for English language arts and mathematics only.

The results for the PAT acceptable standard showed that the AISI baselines were generally lower than the provincial baselines, especially in Cycle 3. This suggests that AISI projects may have been targeted to some extent at students or schools that had been performing below the provincial average in years prior to the project. For the most part, the AISI trend lines were similar to the provincial trend lines, suggesting that AISI projects generally did not break the general provincial pattern. However, there were some notable exceptions to this. The most obvious was for Grade 3 English language arts, where AISI students started at a relatively low baseline average and continued to improve in 2007 and 2008 even in the face of an overall provincial decline in those two years. The pattern is similar, though not so pronounced, for English language arts in the other two grades. The performance of AISI students in grade 3 mathematics showed improvement in 2007 despite provincial decline but declined with the further provincial decline in 2008.

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[7] The percentage at the acceptable standard actually refers to "at least acceptable" so this includes those at the standard of excellence. A reduction in the percentage at the acceptable level thus implies that more students are below that level.

Comparable figures for the PAT standard of excellence showed a general tendency for AISI students to have been above the provincial average in Cycle 2 but below in Cycle 3. Beyond this, the general pattern is for the AISI trend to follow the provincial trend. While this may be partially an artifact of the fact that the reported AISI numbers are likely higher than the actual number of students involved in AISI projects, this is not the sole reason, since the AISI and provincial means were different in most cases.

5.3 Can the AISI Effects be Adjusted for Provincial Trends?

In principle, to avoid confounding of AISI effects with provincial trends, any changes over time on provincial measures found for AISI projects should be adjusted for these changes in overall provincial results over the same time period. In practice, this proved to be problematic for several reasons, including variations in the differences across subjects and grades, differences in the mix of subjects and grades for AISI and the province as a whole and problems with the number of students reported as participating in the PATs within projects. The data available were therefore not judged to be precise enough to permit any direct adjustment of AISI annual results for provincial trends. However, this could be done if a more precisely matched student level data set were available.

6. Summary and Conclusions

6.1 Interpretation of the Results

These results support the conclusion that positive change has, indeed occurred over time and across AISI projects and measures. However, the AISI design does not allow this change to be attributed unambiguously to AISI as a whole or to specific themes or strategies within AISI. In particular, the effect of AISI is confounded with a statistical regression effect. It is also not possible to clearly separate AISI effects from other changes that may have occurred over time. This is an inherent limitation of the before and after design; a limitation that cannot be overcome by post hoc statistical methods. While analyses such as those conducted here can point to potential alternative explanations for the outcome, they cannot definitively distinguish the AISI treatment effects from other possible sources of change.

The fact that effects are larger for surveys than for achievement measures is indicative of a possible Hawthorne or halo effect. The Hawthorne effect was first noticed in classic studies in organizational theory in the 1920s when worker productivity increased as a result of various interventions – even ones that led to deteriorations in physical working conditions – because the workers were responding favourably to positive attention in an environment where little of it had been accorded to them before. That is, AISI may well be perceived as effective by various stakeholders because of the attention and positive emotions of respect and recognition that are shown to participants, without there actually being any impact on student learning. There is a distinct possibility that the additional resources available, and their use for various desirable purposes in schools, may be the cause of the relatively large effect sizes for the teacher measures in particular. Again, this cannot be positively identified as the cause of the survey effects, any more than can the actual AISI treatments.

While some might argue that a Hawthorne or halo effect is as good as a real one, especially if the goal is to engender positive attitudes, it is not clear that this was the purpose of AISI as a school improvement program. The fact that provincial measures were the most common outcome indicators used, and that the goals of many projects were stated in terms of improvement on these measures, attests to the importance of achievement outcomes in the AISI design. The marginal effects on these measures should be a source of concern – either in terms of failure to have impact on these measures, or in terms of whether these measures are the most appropriate ones or have been selected simply because they are readily available.

The general absence of differential results across themes and strategies may be interpreted in two possible ways. First, it is possible that all of the themes and strategies adopted have previously been shown to be effective, and hence there is no reason to believe that one theme would be more effective than another. The logical extension of that argument is that it may not matter exactly what is done as long as it is consistent with principles or practices that have previously been demonstrated to be effective.

The second, and conflicting, argument is that it is implausible to think that all themes or strategies would be equally effective and that generic themes, such as professional development, might be expected to have smaller effects than more student-oriented strategies such as cooperative learning or differentiated instruction. In this second case, the absence of strong differential effects across themes and strategies, combined with the small overall effect sizes for provincial achievement measures, is evidence that AISI has had little impact on student attainment as measured by these indicators.

It is sometimes argued that an appropriate way to examine effectiveness is to look at "outlier projects," specifically those with the largest positive or negative effects. There is some indication from Chapter 6 of the Cycle 2 Provincial Report that this approach has been used in AISI. Unfortunately, this technique is rendered largely useless because of the existence of what appears to be a large regression effect. It is not plausible to explain why virtually all treatments are highly effective for low baseline students and highly ineffective for high baseline students, other than by a regression effect.

It is also possible that the AISI results are being influenced by external events that are occurring within public education in Alberta, which cannot be accounted for in the analysis. It is clear, for example, that Alberta has experienced in recent years an influx of new residents, from both other provinces and through immigration. This means new students and new teachers, and likely greater student mobility within the province than is being experienced elsewhere. None of these effects are being accounted for in the AISI design or recorded in the data base in ways that allow their effects to be separated from AISI treatment effects.

6.2 Limitations of the AISI Research Design

It is important to recognize that AISI was conceptualized as a school improvement initiative and not a research initiative. While innovation, risk-taking and experimentation were all inherent in AISI, the program was not designed to meet the strict scientific conditions required to establish causal conclusions. At the same time, the desire to show effects on a provincial scale has led to attempts, including this one, to determine if the program has had positive effects on student learning.

Unfortunately, it is not possible to impose an experimental design on the program retroactively and post hoc methods cannot substitute for such a design. However, these methods, particularly replication, differentiation and statistical control can bring us some way beyond the direct baseline-actual comparisons. The more detailed analysis conducted here suggests that extraneous regression effects as well as possible Hawthorne effects are plausible rival explanations for the AISI results.

A further design issue has to do with definition and implementation of the treatments. Under an experimental design, each treatment would have to be carefully defined operationally, individuals would have to be trained to implement the treatment in as uniform a way as possible, and processes would typically have been developed to monitor implementation. None of this is easy in settings as complex as schools and classrooms, and it is not surprising that the AISI design did not include such elements. However, the absence of such information precludes us from saying anything about fidelity of implementation or from estimating the amount of error in the outcomes that is due to variation in implementation.

6.3 Limitations of the Measures

A further concern is whether the measures used, particularly the PATs and Diploma Exams, are appropriate indicators of AISI outcomes. In a typical experimental or quantitative input-output design, the specific outcomes expected from the treatments would be defined and measures of these outcomes devised. It is not uncommon for educational improvement outcomes to be defined in terms of standardized test results. However, in this case, it seems likely that the PATs and Diploma exams were selected more for their convenience and universal availability than for their direct relationship to the treatments of interest. There are indications that the results for these and other measures included in the data base are not matched directly to the students involved in particular projects. Also, most students in Alberta public schools seem to be involved in one or more AISI projects and the duration of their involvement may vary with student mobility or grade placements. Although the PATs are administered to individual students only every three years, results are available at the school or district level every year. In the absence of student level data, it is impossible to determine to whom the reported results apply, whether the same students are in a project for one, two or three years, or whether students are involved in multiple projects.

It might be argued that local student learning measures are better than the provincial measures because they can be more specifically tailored to the projects. It is noted that many of these measures are also standardized tests of various kinds. What is not known is whether these were selected to create a fit to the project or if these were also selected for convenience. In any event, the great variety of these measures makes it difficult to judge their appropriateness or to compare outcomes across measures. Technically, the use of effect sizes addresses the comparability problem by standardizing the measure of change. However, this does not help in interpreting what the change means.

As for the surveys, it has already been pointed out that the results on these measures may plausibly be interpreted as pointing to a Hawthorne or halo effect. Some might argue that improved results on these measures are desired outcomes in their own right. This is a matter of what outcomes are valued by the Alberta system. However, as already noted, there is no clear way to distinguish between AISI effects, regression effects and general changes over time and halo effects on these outcomes.

6.4 Data Base Quality Issues

Systematic data collection, with a focus on outcomes, has been part of the AISI design from its inception. The AISI quantitative data base, along with other descriptive documentation on projects, provides a rich source of information on the program, extending over nearly a decade. More generally, AISI has been well documented in provincial reports at the end of each cycle, research reviews, annual conferences and symposia and presentations at national and international conferences.

Nevertheless, this analysis has revealed several limitations of the data base, from the point of view of statistical analysis of outcomes. The main ones are related to the quality and suitability of the measures as indicated above. Others are more specific to what data are gathered and how the data base is compiled.

The data base consists of data aggregated to the level of average scores on individual measures within each project. The raw data from which these aggregates have been developed consist of achievement scores for individual students and attitude/satisfaction scores for students, teachers and parents. However, the individual scores are not recorded in the data base. Much of the variation in individual scores is lost in the aggregation. This precludes the use of techniques such as multilevel analysis, which can separate within-project variation from between project variation. Furthermore, in the case of the PAT and Diploma Exam measures, and some others as well, this limits the analysis to percentages meeting a specific criterion (mainly the acceptable standard and the standard of excellence) rather than to average scores or other measures of central tendency and variation.

While the difficulty in compiling and managing an individual level data base is appreciated, this is now the norm in most large scale assessments and other projects of this nature. Individual raw data are almost certainly available in electronic data base form somewhere in the system. What is needed is a way to bring these data together. This should not be particularly difficult for provincial measures, as the raw data base exists at a provincial level. What is needed is a way to match individual students with projects. Since a universal student ID does exist in Alberta, this would be a matter of matching the project ID to the individual student.

A student level data base would permit an analysis of the level of participation of individual students in projects and would ensure that the data are aggregated for participants rather than for all students in a school or district, as seems now to be the case for many provincial measures. This would also permit an analysis of the duration of student participation, student mobility and other factors, participation in multiple projects and other aspects of student exposure to projects.

Finally, the data base does not include data on student or school characteristics. Again, a considerable amount of such data must exist in other data bases within the Alberta public school system. Certainly school characteristic data (e.g., school size, grade levels, location, school level socioeconomic status, characteristics of the student body, school level performance on provincial measures, etc.) are available and could likely be fairly easily merged with the AISI data base. A data file does exist on participating schools in each project. If the characteristics of the participating schools could be merged with that file, this would be a first and major step in creating a disaggregated AISI data base. This could be done without creating a complete new data base and is recommended for the full Cycle 3 provincial analysis.

6.5 Research Design Issues

It is perhaps unrealistic to argue that AISI as a whole should be transformed into a large set of randomized clinical trials. However, it seems reasonable to argue that at least some of the larger scale themes and strategies, such as professional learning communities, differentiated instruction or assessment for learning should be investigated with more rigorous research designs. Although many of these areas have been widely researched, the dearth of large scale clinical trials limits the confidence with which we can attribute improvements in student learning to these treatments. Taking this approach might make it possible for Alberta to join the ranks of the few jurisdictions that have made a major contribution to the quality of evidence in education through policies that allow and support randomized clinical trials.

Added to this, it would be helpful if Alberta Education were to clarify whether improvement on provincial measures is an explicit goal of AISI. If not, then it may have to be acknowledged that gains on provincial measures are not the chief priority and that other outcomes should receive greater emphasis.

6.6 Policy Issues

Several policy issues arise from this analysis. First, there is the obvious question of what outcomes are most important and particularly of the relative weight to be placed on provincial versus local achievement measures compared to attitude or satisfaction surveys. If the main concern is that local schools and jurisdictions, and their student, teacher and parent stakeholders are satisfied, then AISI provides some evidence that that is the case – which can be alternatively interpreted as a Hawthorne or halo effect of educators receiving attention and being given a voice in classroom and school decision-making by policy makers. If, on the other hand, the concern is with enhancing the already high performance of Alberta students on provincial measures (and by extension to national and international measures), then it is difficult to argue from the results of this study that AISI has had any noticeable effect. Between and beyond these two positions is the consideration as to whether AISI's apparent effects on teacher growth and student engagement or attitudes are worthwhile in their own right provided they do not have negative effects on measured student attainment.

A related issue is that of value being received for the resources invested in AISI. While this issue cannot be fully addressed from the results, a couple of useful points might be made. For example, AISI could be justified as a large scale research program, designed to determine if particular themes or strategies are effective in improving performance on valued outcomes. While the investment in AISI is large relative to most research programs in education, it is not large relative to research in the natural and medical sciences.[8] It is also not a particularly large component of operating expenditures on public schooling in Alberta. In fact, the annual average of about $70 million since the inception of AISI amounts to about two percent of that total.

In a more ideal world, and certainly under an optimal research design, one would expect to find, among such a large array of themes and strategies, some that are much better than others that could be recommended for wider adoption. The fact that few interventions could be identified as especially effective or ineffective suggests either that all AISI themes and strategies are of equal value or that the value of any specific theme or strategy does not matter as long as there is a net gain to the system. This takes us back to the idea that of the impact of a systemic Hawthorne effect.

6.7 Recommendations

Even within the current quasi-experimental approach, a number of measures might be taken which could improve the scope and quality of the data available for secondary analysis. Most of these have already been mentioned and are simply reiterated here.

- A student level data base is needed, which includes baseline and outcome data on individual students, as well as background information on these same individuals, and linking this data base to existing provincial data bases. This is key to improving the ability to apply statistical control techniques to distinguish treatment effects from other influences on outcomes.

- More generally, all data should be recorded in the data base at the lowest level of aggregation at which the data are collected.

- Systems should be developed for monitoring the implementation of treatments or innovations and the quality of the data provided.

- Clearer documentation is needed on the content of local and survey measures.

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[8] As a rough comparison, the Alberta Research Council has an annual operating budget of $93 million plus about $50 million in grants and contracts. This compares to $70-75 million annually for AISI.

- Analysis is required on the validity of the measures being used in relation to project goals and designs. More specifically, a clear decision is needed on whether provincial measures should continue to be emphasized, and/or others developed instead/as well.

- Further analysis is required on student and school characteristics as possible contributors to the results. Some of this can be done by judicious merging of the AISI data base with other data bases maintained by Alberta Education. Other work along these lines would require enhancement of the data base, as indicated above.

The following recommendations apply to the broader policy issues of AISI goals and the link between research goals and more general innovation and school improvement goals.

- A clearer statement is needed on the research function of AISI relative to its other purposes, particularly to its purpose as a stimulator of innovation.

- Some of the major themes and strategies within AISI should be investigated using a randomized clinical trial design. This would address the confounding of AISI effects and extraneous effects inherent in the existing design and would permit the program to contribute more directly to the broader literature on the effectiveness of specific innovations.

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Chapter 3: Using Complexity Science to Study the Impact of AISI on Cultures of Education in Alberta

By Dennis Sumara and Brent Davis

1. Introduction and Overview

1.1 Orienting Questions

This investigation was oriented by the following queries, originally posed in October 2008 by Alberta's Deputy Minister of Education, Keray Henke:

1. What is the value of the Alberta Initiative for School Improvement (AISI)?
2. Why couldn't jurisdictions do this anyway (without AISI)?
3. Would the values of AISI continue without funding?
4. Has AISI changed the culture of education in Alberta? If so, how has it?

We were invited to bring a 'complexity' reading to these questions – in brief, to study the manners in which AISI might have affected educational cultures within different school districts, their perceived benefits and difficulties, and whether such influences might be self-sustainable.

1.2 Research Frame: Complexity Thinking

Complexity thinking has arisen over the last half century. In education, it has been used in relation to areas such as neurological process, interpersonal dynamics, and global ecology. Complexity research is characterized more in terms of *what* one investigates than *how* one investigates. We operationally define complexity research as *the study of learning systems*. Any adaptive system that exists within a vibrant context can be understood as a "learner." Necessary traits of complex systems compiled by complexity researchers that are also relevant to this study include:

- *Self-Maintenance* – complex systems/unities adapt and adjust on the fly in response to other dynamic agents and evolving circumstances;

- *Self-Amplification* – the behaviors of complex unities are better characterized in terms of feedback loops (that self-amplify or self-dampen) than in predictable linear-causal terms;

- *Harmonization of Internal Redundancy and Internal Diversity* – complex systems do not operate in balance – indeed, a stable equilibrium implies death for a complex system. Rather, the internal dynamics of complex unities are dynamic harmonies, such as an ongoing dialectic of samenesses and differences among subsystems within a grander system;

- *Level-Jumping* – owing to the nested structures of complex systems, it is possible (and often necessary) to distinguish and select those levels of an organizational system that are most relevant for any issue.

- *Decentralized Network Structure* – the 'fingerprint' of a complex unity is a fractal-like structure of nodes of subsystems clustering in larger nodes, which in turn cluster into larger nodes – each giving rise to new patterns of activities and new rules of behavior;

This latter quality is of particular significance to this research and relates to network theory.

1.3 Network Types

Within network theory, four categories of networks have been identified (see Fig. 3.1). Each has a specific structure with advantages and disadvantages.

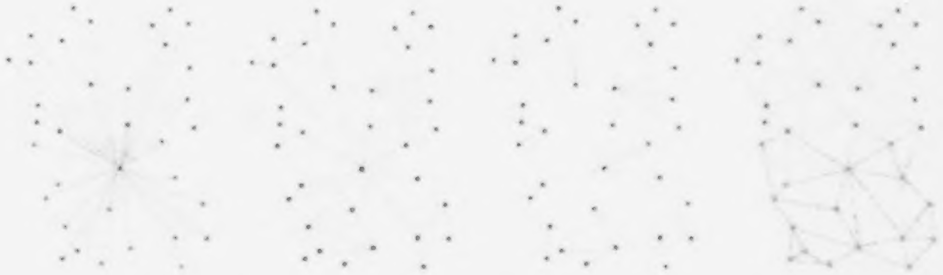

Figure 3.1. Four Types of General Network Structures (drawn on identical sets of dots): centralized, decentralized, fragmented, and distributed.

The centralized network has a hub through which all relationships (e.g., flow of information, channeling of resources) are mediated. Advantages are efficient communication and resource distribution. However, it is only as robust and only as flexible as the central hub.

At the other extreme, *a distributed network* is characterized by tight and extensive local connectivity, but no large-scale systemic connectivity. This structure has the advantage of being very robust. However, distribution and communication is very inefficient – and, by consequence, phenomena structured this way are highly resistant to change.

A *decentralized network* comprises many centers. Nodes in such networks tend to be decentralized networks themselves. This structure combines reasonably efficient communication with a reasonably robust structure, enabling considerable flexibility and high adaptability.

Because the decentralized network structure is associated with life and learning, it has a certain susceptibility to contexts. For example, a decentralized system can be 'forced' to take on a more centralized organization through increased stress or constraint (e.g., sudden limitations on resources, removal of certain freedoms). Conversely, shifts toward more distributed structures can be triggered by removing stresses and constraints (e.g., overabundant resources, removal of accountability measures). As well, for all decentralized networks, there is an ever-present possibility of decay into a fragmented network, in which the grander coherence fails through, for example, the loss of a layer of 'connective tissue' such as a shared purpose or reliable intermediaries.

Triggering the emergence or recovery of a decentralized network structure is more complex than destroying one. Figure 3.2 illustrates some possible starting places in such efforts. Decentralized networks must be in constant disequilibrium. There must be stressors (both familiar and surprising) that compel them to adapt/learn. Such stressors should not be seen as *causes* for change, but as *occasions* for transformation.

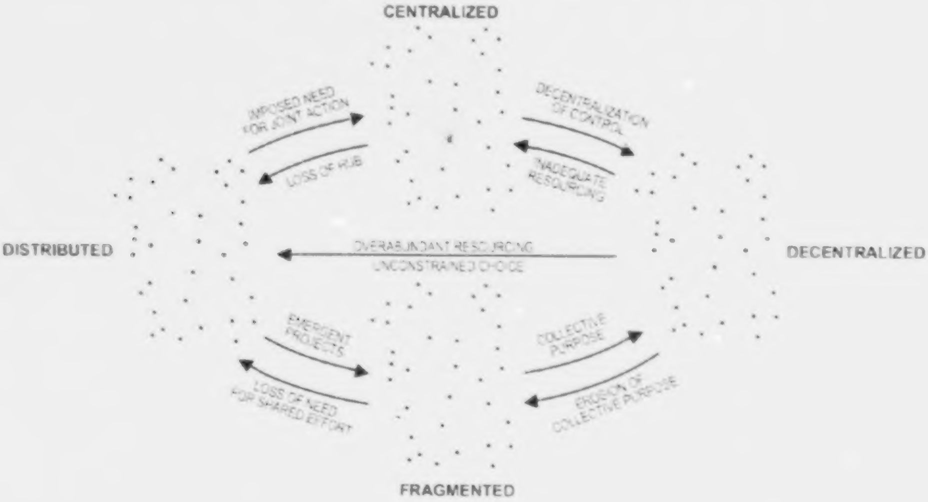

Figure 3.2 Some triggers for movement among different network structures within social systems

These possibilities map out how people and ideas can network. We applied these possibilities to investigating communications and relationships and the emergence or not of robust and productive learning systems within three districts, with particular reference to AISI. This analysis also revealed insights into *external* relationships and networks with a grander learning system at the provincial level.

1.4 Methodology

The unit of analysis or "learning system" in this study was the school district. Three were selected in consultation with the School Improvement Branch of Alberta Education: one in a large urban setting, one 'rural,' and the third in a smaller urban setting. Being attentive to the temporal frames of social and cultural systems, this report is thus organized around three *descriptive case studies*, oriented by an ethnographic attitude towards the meanings and mindsets of each district's culture, and informed by network theory.

Fieldwork was accomplished through a two-day visit to each district. These visits comprised information sessions, focus-group interviews, and individual interviews – involving administrators, teachers, school board officials, parents, students, and other community members. In each district, meetings were conducted in two schools and at the school board office. We aimed to discern the networked structures in each district, how these networks might have arisen, and how they enabled and constrained possibilities for AISI within the district. We were specifically interested in how people were or were not connected to one another, how resources and information are distributed and accessed, and how ideas and innovations circulate.

1.5 Structure of the Chapter

Our data and interpretations are presented as "portraits" of the three districts and what each perceives its work to be. Using data gathered during our site visits, we describe the mindset that structures each district's ways of conceptualizing its work and its understanding of learners and teachers. We explain how each mindset informs how different roles and relationships are enacted, how these enactments contribute to the district mindset, and how all of these influence the ways school innovation and school improvement (through AISI) is being understood and enacted. Each portrait is organized by the following five questions:

1. How does the District conceptualize its work?
2. How does this conception of work influence this District's implicit conceptions of learning and learners?
3. How do these conceptions of learning and learners contribute to enacted roles and relationships in this District?
4. How do these enacted roles and relationships contribute to the developing and maintaining of the organizational mindset that guides this District?
5. How does this organizational mindset influence the ways AISI is understood, conceptualized, and operationalized within this District?

2. Pathways School District: The work of the District is *learning*.

2.1 How does Pathways conceptualize its work?

During a focus group meeting, the Superintendent explained: "Learning is the work. Things are always changing in our District." This emphasis on learning was evident in every interview we conducted. School Board members described their role as "learning how to pay attention to what our students and teachers need to enhance their learning." Teachers continually expressed the importance of career-long learning as a way to ensure that students' learning would be enhanced. One teacher explained, "When I first came to this District I thought I'd be here for only a year or two. What has kept me here for many years has been the extraordinary opportunities to learn that have been provided."

Enabling this emphasis on learning is a seemingly paradoxical relationship between site-based management and collective decision-making. While schools are given considerable autonomy with budgets and school management, the explicit linking between and among schools through structured and organized practices of District-wide consultation and collaboration have helped to create conditions for this District to continually monitor and adjust its activities and priorities.

Coupled to these structural and organizational features was the often-expressed belief that ongoing learning and the change that accompanies learning is enhanced by a willingness to engage with ideas and practices that are not entirely known or familiar. As the District AISI Coordinator explained, "We know the importance of taking risks – to take risks and flounder. We know that if we're willing to do that a lot of good will come of it." A school principal commented, "In order to be an effective learner you have to be willing to be in a continuous state of fluctuation." Commenting on the importance of supporting innovative projects funded by AISI, a School Board member stated, "Sometimes it's like cooking soup that turns out differently than what was thought. I would like to see risk being increased rather than calmed down."

2.2 How does this conception of work influence the Pathway's implicit conceptions of learning and learners?

Change and learning are considered to be synonymous, and it is understood that change cannot occur without some degree of difficulty and uncertainty. As one administrator explained, "There are tensions between capacity building and measuring, tensions between creating the conditions to risk and to innovate." Another administrator explained: "We send groups of teachers to conferences and we ask them to bring those ideas back here and use them. … We are prepared to take risks with what we've learned."

All schools have used AISI funding to schedule time for teachers to meet and work in groups. Lead teachers from each school meet at a District level to share ideas. The work of learning and learners, then, is considered to emerge from the work of collaborative connectivity. One teacher explained, "We know that if three of us decide to do it, it takes the riskiness out of it. We can push ourselves further individually because we have support." Another stated, "Our administrators encourage us to try new approaches. If they don't work, we know we can try something else." Effective learners and learning, then, emerge from strong relationships among learners.

Teachers and administrators in this District tended to use collective pronouns (we/us) rather than personal pronouns when discussing learners or learning (including their own learning). Administrators regarded the creation of these strong relationships as one of their primary responsibilities. One District administrator explained, "The more relationships you can build in leadership, the better chance you will have with being supported with change." The work of learning is understood in this District as lifelong and, therefore, the learning that can be noticed and measured in schools is viewed with healthy skepticism. A school principal suggested, "It takes more than three years for a system to change." Another explained, "I don't think we'll notice the effects of our AISI projects in three years. If we track these kids, we'll notice the most significant changes in 20 years."

2.3 How do these conceptions of learning and learners contribute to enacted roles and relationships in the Pathways District?

Key people have become 'hubs' in the District's decentralized network, carrying an important historical perspective on how developments in the District may or may not link to emerging challenges and opportunities. The Superintendent explained, "There is an openness to our conversations. [The AISI Coordinator] is the conscience of the admin team. He is the person people look to in the system to say difficult things that need to be said."

People and systems are fluidly organized in ways that allow specialized knowledge to move to the fore as needed to contribute to the emerging directions being developed in the District. As a result, the District embodies an understanding that leaders and leadership must shift in an adaptive and distributed way as the system adapts and changes. In the words of one school principal "My role is to say 'yes.' If you believe that power is meant to be given away, then you say 'yes' to things even if you can't do them or personally control them." Teachers confirmed this sensibility. "There is no clear leader [of our AISI projects]. There are a number of them who take responsibility for different things at different times." This emphasis on building and maintaining relationships emerges because, as one principal put it, "We are building leadership capacity through collaboration. It's being done by building relationships and trust."

This approach to decentralized leadership is supported by the District's conception of the District's work as learning, and by the need for learners and learning to be supported by nested layers of supportive communities. The AISI Coordinator for the District described it in this way: "We have well-developed networks of people throughout the District who know how to work together. We have had considerable training in collaboration and in how to develop and use a professional community model of learning."

2.4 How do these enacted roles and relationships contribute to the developing and maintaining of the organizational mindset that guides the Pathways District?

The boundaries around institutions and people in different roles are porous. Teachers, staff, administrators, and consultants know one another and rely on these relationships to assist the ongoing work of learning. One teacher knew "80% of the 300 teachers in the District." Another observed, "We are not closed off in any way in this District." The Superintendent stated, "I can go to any school and tell you by name who is in each school. There are many opportunities for people to get to know me and one another."

This well-developed culture of relationship building supported the ways new ideas were infused into the system – often through informal interactions. One new teacher explained, "You can bring your ideas to anyone, anytime. Like you're standing in line at the Tim Horton's and [names Superintendent by first name] is there – and I can give him my ideas right there." Another added, "Everyone seems to have a voice: parents, community members, teachers – everyone. And our School District accepts all of that. You can talk about anything to anyone."

The importance of connecting and collaborating seems to have instilled into the district a robust regard for difference and diversity – with an implicit understanding that these qualities create conditions for enhanced systemic learning. A school board member, AISI Coordinator and teacher made the same point: "We have a respect for diversity," "we can't all walk down the same road together at the same time."

2.5 How does this organizational mindset influence the ways AISI is understood, conceptualized, and operationalized within the Pathways District?

Pathways had longstanding processes and structures that facilitated communication, connection, and collaboration in schools, between schools and local communities, and between and among schools and the District office. These values of seeing the primary work of the District as learning have been catalyzed by AISI opportunities. The Superintendent explained, "I see AISI as the spark in the network." This helps to explain the depth and breadth of understanding of AISI projects across this District community, and why AISI initiatives were not disconnected from the District's overall work.

Pathways has been able to leverage AISI resourcing to enhance the learning potential of the entire District. Pathways seems to believe that the best way to improve schools and student learning is to develop and support a robust decentralized network of communication, collaboration, and decision-making, all of which are attuned to lifelong learning for staff, teachers, administrators, School Board members, and members from the community. In creating this network of learning, the District seems to have accommodated considerable diversity of projects, ideas, and opinions yet also maintain a robust internal coherence in terms of emergent mission and vision. As several teachers explained: "[AISI-supported structures and initiatives] have allowed us to develop a common language. We are basically all on the same page."

2.6 Summary

Among the core elements of the Pathways District's self-narrative are connectivity, a commitment to shared work, an appreciation of the inevitability of change, and support for innovation. Prior to AISI, considerable energy and resources had already been committed in support of professional development. Across the District, a culture had emerged in which new and "disorienting" ideas, processes, practices, and structures could be incorporated and tested without compromising the integrity of any one individual or school. In particular, the District seemed able to take advantage of diversity – both pre-existing and newly introduced – of people, experience, practice, belief, and ideas.

This long history of valuing communicative connectivity as a way to enrich learning across all levels of the District meant that Pathways was able to use AISI funding to *amplify* what it perceived as its primary work: finding ways to enhance learning for all students and teachers. Most AISI resources have been used to further improve webs of connectivity and communication by, for example, leveraging AISI dollars against other funding to provide release time for teachers to meet. As a learning culture, Pathways has learned to think in groups and to be aware of how new ideas emerge from these collective learning experiences. In the process, Pathways is able to conceive of itself as a knowledge-producing system, and not merely a knowledge-disseminating system. A vital aspect of this knowledge-producing character arises in the District having managed to tap and support internal and external sources of *diversity*. New ideas are deliberately drawn in by subgroups, while structures are in place to recognize and utilize local expertise. This powerful use of diversity is greatly enabled by the emergence of a "shared vocabulary" – a conscious recognition of the importance of *redundancies* on the level of collective action.

Pathways' emphasis on learning enables it to exist comfortably in an ongoing state of disequilibrium. The District confronts its challenges through a *decentralized structure*, in which key hubs – places, structures, and personalities – operate to ensure connectivity of stakeholders, flow of information, and archiving of experience. These hubs are often organized around key people, including the current Superintendent and AISI Coordinator. However, consistent with a decentralized structure, many others have emerged as key hubs and nodes in the system's network, leading classroom-, school-, and district-wide initiatives.

3. Hearthstone School District: The work of the district is *service*.

3.1 How does Hearthstone conceptualize its work?

Within Hearthstone, a conception of "service as the work" appeared to drive an uncompromising work ethic relative to learning and teaching, with particular attention to ensuring that the very best ideas and practices would be known by as many teachers as possible. An Associate Superintendent explained, "We have been on a journey of making cultural change in the District. We now have in place a robust bottom-up/top-down collaborative process, which has really helped us to use our AISI funds productively."

Over the years, this District has established a robust layer of specialist consultants who act as the "clearinghouse" for educational research and best practices for teachers. Some of these work out of the District office, while others work as specialist teachers in schools. Funded in large part through AISI, this layer of specialist support has become an important way for this District to connect people to new ideas from research and to ensure that these ideas are integrated into teaching practice. As one consultant explained, "I spend two to three days a week coaching teachers with new ideas and practices that I've learned."

3.2 How does this conception of work influence Hearthstone's implicit conceptions of learning and learners?

In this District, learning is the work of each individual. The work of individual learners should have discernible and measurable products. One senior administrator explained, "We have graphed our students' progress over time, and we have seen the changes on the PATs." A diversity of approaches to learning and knowledge dissemination is supported by attention to developing specialization. Strong interdisciplinarity has been achieved through enhancement of subject area and issue/practice (e.g., inclusive education, pastoral counseling services) specializations.

This willingness to devote considerable time and money to specializations is supported by what a deep and abiding respect for the autonomy of individuals, who become linked in community through shared beliefs and values in this District, and who are also linked through a commitment to demonstrate excellence in their learning achievements. As one senior administrator stated, "I love the accountability [associated with AISI] because it gives me the leverage to go to schools and say, 'We are accountable for these dollars.'"

This discourse of accountability both supported and was supported by a strong cultural belief that the primary work of learning was to ensure that teachers had access to the very best research and practices available, which would enable the ongoing improvement of student learning in schools. While there was evidence of considerable collaboration among teachers in local school sites, its principal purpose was not to create knowledge but to enable efficient distribution and dissemination of "best ideas and practices." As one teacher put it: "I would leave the [sorting through all the research in this area] to the consultants. Let them figure out what is going on and then share it with us."

3.3 How do these conceptions of learning and learners contribute to enacted roles and relationships in Hearthstone?

In Hearthstone, people and systems are organized in terms of how they might best provide services to one another and to the local needs of schools and communities, based on the values and commitments established by the District community as a whole. People were well aware of the responsibilities of their roles. They understood they were assigned these roles because of their specific expertise, so they could provide optimal service to others.

There is good connectivity within schools among teachers, administrators, and the community, with a well-developed understanding of how research and best practices enable the development of success in learning for students. However, teachers do not have a global sense of what is happening in the District. 'Weak links' that support collaboration between and among different schools in the District were absent, largely because attention and value is placed on being very efficient with knowledge gathering and dissemination, not knowledge production.

Most teachers were not sure how decisions were made about AISI projects and were not clear about what was happening across the District. When asked directly about how decision-making relative to AISI occurred, one teacher stated, "I don't know anything about that." Another teacher explained, "I appreciate there are people who have a vision in certain areas and have taken the time to invest because I know it's a big job. I haven't been part of developing projects, but I know others have been. It's a huge process."

3.4 How do these enacted roles and relationships contribute to the developing and maintaining of the organizational mindset that guides Hearthstone?

Hearthstone's system of trust has enabled a hybrid "top-down/bottom-up" approach to decision making. One senior administrator explained, "It's a focused goal-development process with a lot of communication and a lot of feedback." This development process is led by a steering committee that sets the overall direction for AISI projects followed up by a review committee that recommends specific projects that are eventually ranked, with some developed into proposals. People occupying all roles are involved in these processes; however, primary decision-making authority rests with the senior District leadership.

We received mixed reviews and messages about how these processes are experienced. Most were supportive. One teacher explained, "We buy into [the AISI projects] quickly because we trust the people that are offering them to us." Another commented, "I trust [names senior District administrator] and [names AISI coordinator] have gone through and worked the profiles for the AISI funds, so I know that they have done their jobs." The layer of specialist consultants in the District office or in schools select appropriate ideas and practices and ensure they are known and used in schools. The consultants are attuned to what is happening across the District. They are the channels of knowledge exchange between and among research/practice, schools/central administration. The schools, then, take up these ideas and integrate them into their local priorities and needs.

3.5 How does this organizational mindset influence the ways AISI is understood, conceptualized and operationalized within Hearthstone?

In the Hearthstone District, a robust service layer was developed and expanded, in part through AISI funding, to provide a well-developed interface with relevant educational research. One teacher commented, "We just know when it's coming down the pipe that it's tried-and-true, based on good research, so we know that it will be a successful project, and we're willing to put our efforts into it."

One consultant explained, "AISI has helped us to create new networks of support that were not there before. We're now a whole new organism." A specialist teacher commented, "Whether we are lead teachers or consultants, the amazing opportunity for professional development was embedded into our practices at every level. And all informed by new research on best practices." It is these "best practices" that have created the connectivity in this District. Although teachers across schools did not seem to be aware of one another's specific communities or projects, they were aligned around similar ideas and practices, emerging from their connections to centralized specialist consultants.

With considerable vision and leadership from the Associate Superintendent and AISI Coordinator, the District has created a strong layer of trusted specialist consultancy, which has become important connective tissue among university-based research, central administration's goals and priorities, and local needs of schools in the District. One teacher summarized it thus: "We are not a chain of command, but a chain of trust. It seems to work really well."

3.6 Summary

In the mid-1990s, Hearthstone was quite distributed, lacking systemic focus. The District's central administration had begun to address this issue a few years prior to AISI's introduction, implementing a District-wide, research-focused professional development project for all teachers. This initiative was commonly described as a defining moment in the District's unfolding narrative, being emblematic of a strong commitment to service and support for all and a way of achieving systemic *coherence*.

The centralized approach to that initiative set the stage for Cycle 1 of AISI, which was developed around several District-wide projects that were highly centralized and oriented toward teacher support. These projects brought forth new forms of collaboration and connection not previously possible in the District. As well, in conjunction with projects initiated in Cycles 2 and 3 Hearthstone now had the opportunity to create a robust specialist/consultancy service layer. This has helped to *amplify* the District's narrative of service and support.

However, while this new service layer is effective, it contributes to a culture of knowledge-distribution and not also knowledge-production. It operates well in moving new ideas from a central authority to individual teachers, supporting the emergence of *redundancy* through a "common language" and being "on the same page". However, the system seems unable to recognize, much less capitalize on, the tremendous *diversities* of expertise and interest present within the District community.

Hearthstone has evolved over the last 15 years from being quite distributed to much more *centralized*. At the moment, its AISI projects operate within a somewhat *fragmented* network. This evolution has been greatly enabled and enhanced by AISI, perhaps even triggered by it. The service layer that has arisen through AISI projects has become an effective clearinghouse for ideas and practices. At the same time, some schools (or nodes) do not feel as strongly connected to other nodes as they might, owing in part to the fact that not all schools are involved.

4. Arrowhead School District: The work of the district is *management*.

4.1 How does Arrowhead conceptualize its work?

A strong work ethic organizes the overall mindset of Arrowhead. This was evident in the orienting meeting with central and school administrators, teachers, School Board members, consultants and parents where there were many references to creating and supporting structures that would ensure goal-oriented efficiency and accountability. The Superintendent stated, "There has to be a grand scheme. We set the directions and then schools build their plans."

There is a strong commitment to discerning "best practices" emerging from educational and other research on learning that might help to improve student learning. Arrowhead has encouraged school-based AISI projects, which in some schools have become embraced by teachers over time. The AISI coordinator in one school explained, "We tried to make sure that everybody got a little bit of AISI; some people got more, but everybody could participate."

Paradoxically, Arrowhead's explicit work ethic has created some loss of connectivity among schools and between schools and the District office. A number of teachers and administrators were very concerned that the decision to centralize AISI with one project was not only curtailing most school-based initiatives, but also communicating disregard for systems of in-school and inter-school connectivity that earlier projects had created. The emphasis on managerial efficiency by consolidating all AISI funds into one major project is creating a networking shift in the District – from being more distributed to more centralized. As one teacher put it, "So we've moved from individualism to a more collective whole – where now a [steering] committee sets the expectations and how we are to meet them."

4.2 How does this conception of work influence Arrowhead's implicit conceptions of learning and learners?

In the Arrowhead District, learning is understood as the work of the individual. These efforts of individuals should have discernible and measurable products. While some culture of collaboration had been established in the two schools we visited, collaboration did not extend much outside school subject area departments, among grade levels, or across schools. As one administrator stated, "We're trying to connect to other schools, but we're not having much luck."

Most people with whom we spoke discussed learning as the process of developing competence and producing artifacts demonstrating that competence. One teacher commented, "AISI has provided a lot of good materials, teacher resources, books, and student books. [We appreciate these because] we're so busy trying to survive." One school had become very innovative by archiving teacher-generated curriculum resources online with access via interactive whiteboards located in each classroom. However, one teacher was concerned that teachers did not seem to have opportunities to collaboratively create or share curriculum resources. Collaboration often entailed more work with little benefit. She commented, "[The District] does not provide funding for us to do the prep work for subs while we're sharing our work with other teachers. Sometimes I feel like I'm the only one sharing."

Overall, effective learning and school change were seen to occur in an ordered and predictable environment, where the direction and tone for these changes were set by senior administration. One school principal stated, "AISI has helped me to move the school forward to where I wanted it to go." In this learning orientation, failure is to be avoided if possible and, when noticed, is a problem to be solved. As one administrator explained, "There are four major projects in the District of varying quality. ... Why waste the money and keep on going?"

Architectural and monetary/value-exchange metaphors were often used to describe both learners and structures/processes of learning. For instance, one senior administrator explained, "The question becomes where one puts the money so we can get the best value for our dollar." These discourses of efficiency characterized comments about how AISI funding had been used very efficiently and responsibly to create effective learning environments for students. While the schools we visited seem to have found ways to cohere internally into a collective mindset around learning, there was little evidence that teachers had a more global understanding of how other schools in the District are organized.

4.3 How do these conceptions of learning and learners contribute to enacted roles and relationships in Arrowhead?

Arrowhead seems to hold three interrelated conceptions or beliefs: learners are oriented toward the mastery of established content; learning is the work of the individual; and hard work and efficiency are greatly valued. These connect to a clearly articulated hierarchy of authority and centralized decision-making. Senior administrators take seriously their responsibility for working closely with the Board to use funds appropriately (in accordance with Alberta Education priorities) and to set directions for innovations deemed necessary for the entire District. There are strong collegial relationships among senior District administrators and elected Board members, with opportunities for shared decision-making at this top level.

Within this organizational structure, individual teachers are primarily responsible for planning and developing their own professional learning, which is evidenced and measured in the production of physical artifacts that are not unlike those in place to monitor and "authentically assess" the learning of their students. The principal's role appeared to focus on effective management of teachers' activities by ensuring that some resources and release time are provided for teachers to pursue their individual professional learning goals. This structured approach does not appear to set a context for collective knowledge production or dissemination, requiring little collaboration and/or communication between and among teachers or administrators. One teacher commented: "All of the departments seem to have trouble communicating with one another." When collaboration occurs, it is primarily to distribute ideas and workloads in an equitable and efficient manner.

4.4 How do these enacted roles and relationships contribute to the developing and maintaining of the organizational mindset that guides Arrowhead?

A commitment to efficiency also seems to have oriented Arrowhead to focus attention on one major project. This is seen as a way to maximize the impact of AISI funding on teacher development and student learning. As the Superintendent explained, "A lot of money goes to professional development. Most of it is sub costs, conference costs and travel costs. If [teachers] are going to one conference, it may be 15 people going to it – and that's a huge amount of money. You could bring in that person for several days and everybody in the system really gets to see them, hear them and work with them." One major challenge for this District seemed to be getting teachers to "buy in" to centrally directed AISI projects, mostly because the move to centralization meant removing resources that had once been locally situated.

One of the effects of a centralized approach to management and decision-making is an overall lack of information within the system of how AISI monies have been or could be used to improve student learning. In one school, where funds had previously been used for teacher release time, one teacher commented, "So you have an extra prep, and now you're sitting in your room wondering, 'How is this going to help me to do anything?'" School based administrators described themselves as "mostly cheerleaders." One teacher commented, "I have a feeling that some of our administrators might not know what AISI is about."

4.5 How does this organizational mindset influence the ways AISI is understood, conceptualized, and operationalized within Arrowhead?

The Board of Trustees in Arrowhead works very closely with the Superintendent and the AISI Coordinator to determine the best (most fair, efficient and effective) uses for this funding, relying heavily on expressed District goals and values. These goals and values are explicitly tied to Alberta Education accountability pillars. This past year, the decision was made to centralize all AISI monies into one initiative that would involve all schools and teachers in a research-based project to improve instruction at all levels. The AISI Coordinator will work with all schools in the District to organize release time for teachers who are participating, and also to provide other necessary supports to ensure that these new ideas are integrated into classroom practices. In effect, AISI monies are being leveraged with other professional development funds in the District to create a more robust approach to teacher learning. As the AISI Coordinator explained, "Professional development and AISI: They are not different. … With Cycle 4 I am using funding for teachers to collaborate, so that they can participate in the [name of the initiative that was chosen]."

It is not yet clear whether this decision will create greater connectivity in this District, or whether it will create the sort of alienation teachers sometimes experience when a particular approach to professional development is mandated. Teachers with whom we spoke expressed concern about the movement to centralize, viewing this as an intrusion on their professional development autonomy. Others had pragmatic concerns, related to the work it would take for them to attend the required days of professional development mandated by the District: "Every teacher will spend five days at workshops [given by this person] and that means five days of preparing for subs!" While supportive of the District's initiative, one school administrator expressed some concern: "With Cycle 4, I am losing the funding for teachers to collaborate in the school and that's hard."

4.6 Summary

Data collected from the Arrowhead District pointed to a system that had become quite distributed. There was evidence of very good quality communication in nodes of the system (including within each school), but weak communication between and among nodes and across administrative levels. In part, this has emerged from a long history of very good management, where central administrators have excelled at using public funds well and have responded appropriately to mandates of Alberta Education. Indeed, references to this strong managerial ethic constituted the principal site of *coherence* in narratives of the District offered by its members.

Consistent with these long-standing narratives, AISI funds have been used to *amplify* sound management structures, focusing on projects and processes that are clearly articulated and carefully aligned with Alberta Education goals, particularly as those goals relate to school improvement, student success, and district accountability.

Strong management has also contributed to pockets of excellence, with regard to a few school-specific AISI projects. These undertakings are *diverse*, powerful, and frequently referenced as exemplars of the provincial initiative. At the same time, they are very localized. There is little sense of District-level accomplishment around AISI. In particular, this system appears to lack the sort of communicative *redundancy* that is necessary to either an effective knowledge-disseminating system or a robust knowledge-producing system.

It is important to note that in Cycle 2 of AISI, the Arrowhead District devoted a substantial portion of new resources to the creation and support of in-school professional learning communities – including, in particular, considerable release time for teachers. However, this was done in a very *distributed* manner, in which communications across schools and levels of organization were not well developed. Consequently, the intended "professional learning communities" did not have the sort of system-wide effect that was hoped. They did operate within schools to good effect, but beyond school walls, discourses of disconnection, territoriality, and competition prevailed. As a result, with respect to AISI, the District seems to have maintained a *fragmented* network of projects through Cycles 2 and 3. This detail has not gone unnoticed, and was in fact identified by District administrations as the main impetus for the move to *centralize* AISI work through a single major project in Cycle 4.

5. Revisiting the Research Questions

5.1 What is the value of AISI? (What are the values of AISI?)

The Alberta Initiative for School Improvement is organized around an explicit awareness that the improvement of student learning is intimately entwined with improvements to the contexts of learning. This core value of AISI is the key to understanding its emergent values of *collaboration* and *connection*.

In each of the three districts we visited, across all three of the AISI cycles to date, there has been a dramatic increase in opportunities for teachers to *collaborate* in shared learning projects. Teachers have chances to meet with, learn from, and inform one another. This has been of immeasurable value – with regard to innovations, educators' attitudes toward their role, and appreciation of the range and depth of teacher expertise in the province.

The requirement to infuse current research into AISI-related projects has sparked considerable *connectivity*, as each district developed strategies and structures to gather and infuse new thinking into its system. In our extensive experience with school jurisdictions across the country, we have never encountered districts with greater awareness of or tighter links to university-based research and researchers.

5.2 Why couldn't jurisdictions do this anyway (without AISI)?

A school district is more than an administrative structure. Each of the three districts has a core narrative that is coherent and stable, that is rooted in history and anchored to community, and that informs discussions and orients decisions. While these qualities are vital for effective and efficient day-to-day operation, they can be limiting. To that end, AISI has helped to *interrupt* and to *amplify*.

Like all complex systems, all of the districts we studied are engaged in ongoing adaptation as new educational and contextual challenges arise, and these adaptive activities certainly preceded the introduction of AISI. However, through challenging districts to innovate, demanding accountability, and infusing a level of uncertainty around the maintenance of funding, AISI is providing a different-from-usual source of disequilibrium. It is not allowing districts to slip into a 'comfort zone' or to do 'business as usual.' It is unlikely that this sort of *interruption* would occur without AISI.

AISI has also *amplified* the work of each district. This has highlighted important strengths and also unearthed some less positive aspects. Through compelling districts to confront such matters, AISI is presenting an occasion for systemic transformation that would likely not otherwise be possible.

5.3 Would the values of AISI continue without funding?

Our strategy for addressing this question was to attend to the mindset of each of district. We wondered if the emergent values of AISI – in particular, the elements of collaboration, connection, interruption, and amplification – were consistent with the historicized characters of each district.

In one case (Pathways), in which the District organized its work around a narrative of learning and learners, it is likely that the values of AISI would continue without direct funding, given the District's pre-AISI history. Collaboration and connectivity are deeply inscribed in the District's self-narrative, and would likely persist even without targeted funding.

However, with their work organized around narratives of service and management, administrators in the other two districts acknowledged that differentiated funding was crucial to the maintenance of AISI-like projects. Some expressed anxiety over the possibility that AISI funding might be folded into base budgeting, let alone the possibility that it might be discontinued entirely. In districts such as these, without clearly marked funding, the sorts of projects associated with AISI would fade away.

5.4 Has AISI changed the culture of education in Alberta? If so, how has it?

There is compelling evidence that AISI has affected *subcultures* of education in the province (i.e., school districts). For example, above-noted shifts in vocabulary are strong indicators of transformation. Unfortunately, it is impossible to attribute responsibility for such changes.

To explain, each district demonstrated itself to be a responsive and adaptable entity – a learner – built on coalitions and networks that operate in common purpose to create coherent, self-maintaining systems. However, learners must also be resilient. To maintain coherence they must resist some sorts of change even as they adapt to evolving circumstances. This point is especially clear around district mindsets and the associated attitudes toward knowledge. One system (Pathways) manifests the power and possibilities of a knowledge-production orientation; the other two seem to embody attitudes that limit their AISI-related projects to knowledge dissemination. This key difference might serve as an explicit target of the Initiative. In particular, our analysis suggests two important points of emphasis: resourcing emergent networks and embodying a learning mindset.

Regarding the first point – that is, resourcing emergent networks – it bears emphasizing that none of the people we met were able to point to either horizontal (between and among districts) or vertical (across levels of organization, from schools through the Ministry) effects. No one was aware of what was going on in other districts in any great detail. What little was known appeared to be accidental. Given the pockets of remarkable innovation in the province and deep commonalities in interest, expertise, and activity across jurisdictions, the time seems right for some interdistrict networking activity that extends beyond the short-term encounters of annual conferences or the non-interactive structures of web-based archives.

As for the second point – that is, of enacting and projecting a mindset of learning or knowledge-production – we return to the example of the Pathways District. Tellingly, even within Pathways, Alberta Education is not perceived as part of the learning community. Rather it is generally seen as a top-down, disconnected, and dissemination-oriented administrative structure – that is, structurally akin to the Arrowhead District. AISI has done little to interrupt this perception. Noting that culture cannot be borrowed or imposed, but arises organically in the dailyness of communication and shared work, we would thus end our report with the recommendation that efforts be made to enact through AISI a more participatory and decentralized relationship with districts in the province.

Chapter 4: AISI: A Qualitative Case Study

By Dennis Shirley and Lori McEwen

1. Introduction

This chapter describes a qualitative condensed case study of 12 school districts in the Alberta Initiative for School Improvement (AISI). This study employed interviews and focus group discussions to gather data about the *meaning and value* of AISI as experienced by those educators and district personnel who are most involved in and responsible for issues of conceptualization, implementation, and assessment of AISI activities at the district level. The study was solicited by AISI after a colloquium convened in October 2008.

For this study 12 districts were selected by Alberta Education to be representative of the diversity of public school authorities in Alberta by type, size, and location. Public districts included public, Catholic, division, and charter school authorities. They ranged in size from just 1 school with under 300 students to over 200 schools with over 100,000 students. Geographically, the 12 districts were spread across the northern, southern, and central zones of the province; they spanned metropolitan, small city, town, and rural areas.

To explore the research topic, 5 broad research questions and 11 subsidiary questions were finalized in February and March 2009 through a process of consensus by the research team and Alberta Education. The 5 broad questions were:

1. What is the distinctive theory-in-action (change architecture) of AISI?
2. What is the value of AISI? (What are the values of AISI?)
3. Is it possible for jurisdictions to do these projects and activities without AISI?
4. Would the values of AISI continue without funding?
5. Has AISI changed the culture of education in Alberta? If so, how has it?

These were supplemented by 11 subsidiary questions:

1. What have been the successes of AISI, as assessed from multiple perspectives?
2. What are both the obvious and the subtle impacts of AISI?
3. How is AISI lived and practiced by educators?
4. What are the change processes at play for administrators and teachers?
5. What have been the difficulties and challenges of AISI?
6. Has AISI encouraged school authorities to try new things?
7. Has AISI encouraged those involved to take risks and to be more innovative?
8. What are the opportunities to expand the measures of AISI projects from the vantage point of complexity theory?

9. What are the opportunities to disseminate knowledge generated by AISI by using its networks and complexity thinking? Have these opportunities been used to promote change across AISI jurisdictions?
10. How has AISI influenced policy developments at the school, jurisdictional, and provincial levels?
11. What are the implications of the research findings for AISI as a work in progress?

The questions allowed the informants to explore multiple dimensions of their work with AISI to share the meaning and value of their activities. Informants discussed district foci prior to their involvement in AISI, the manner in which AISI enabled them both to deepen and to amplify their work, and the value of AISI as a change strategy that strengthened their communicative connectivity within and across districts. They elaborated on the complexity of change processes and described the manner in which district-level and school-based leadership evolved to support AISI activities. Through these interviews a rich and multifaceted set of data emerged that enabled the research team to discern trends and patterns in AISI, an extraordinarily ambitious and intentional change initiative in Canada's highest-achieving province.

This summary of the research team's findings is organized to focus on the 5 overarching questions with responses and commentaries relevant to the 11 subsidiary questions embedded throughout the summary report for purposes of further clarification.

1.1 Methodology

The research team sought to achieve consistency across the 12 case study district sites by assuring that in each instance individuals in similar positions were interviewed. These included:

- The district superintendent;
- Project coordinators and affiliated staff;
- District school improvement, research and administrative staff;
- School principals and staff involved directly in project implementation;
- Parent and community participants in project activities.

Interviews were conducted in person during district site visits and were semi-structured around the questions with subsidiary probes to allow for maximum rapport. All interviews were transcribed verbatim and subsequently coded to identify and illuminate patterns and variations by drawing comparisons across the 12 case studies. In case study research, the goal is to generalize to theoretical propositions. Thus, the aim was to map the different forms of project and district learning in a number of settings and contexts.

The research team also visited schools and classrooms, which was especially helpful in terms of our ability to see AISI themes and strategies in action. Teachers provided us with opportunities to observe their instruction and to see how children responded to pedagogical and curricular changes that they had implemented as part of AISI-funded projects. Several of the districts had prepared samples of student work so that the research team could track directly how AISI projects were influencing student learning over time. Districts likewise provided the research team with copies of their AISI project proposals, implementation plans, and annual reports. Some districts contacted parents in advance so that we could interview them about AISI activities and their impacts on their children.

1.2 The Case Study Districts: An Overview

Twelve districts were selected by the School Improvement Branch of Alberta Education to be representative of public school authorities for this qualitative case study. The 12 districts provided an extraordinary breadth and range of AISI projects in diverse geographical settings with their own local histories, cultures, and signature practices. Some themes, such as improving formative assessment practices, recurred repeatedly in the 12 districts. Yet more important than the adoption of any single consistent approach, AISI across the districts was seen as a crucial ally in assisting educators to probe deeply into teaching and learning with students' very best interests in mind.

2. The Research Findings

2.1 What is the distinctive theory-in-action (change architecture) of AISI?

AISI is a program that encourages creativity and innovation and supports a wide range of district-led improvement projects throughout Alberta. AISI's theory-in-action empowers educators to develop professional and intellectual projects based on their own locally-created needs assessments and subsequent initiatives for self-initiated change. Over the first three cycles, more than 1,700 AISI projects have been funded.

A stance of what may be characterized as "active trust" from Alberta Education towards teachers and school leaders has produced hundreds of locally-generated initiatives that have catalyzed educators to explore new routes to teaching and learning that often are precluded by more orthodox school reform strategies. AISI projects entail a tremendous variety of undertakings. They span everything from projects serving language minority students to new instructional approaches that develop music as the central component of an elementary school curriculum to schools endeavoring to improve student learning through differentiated instruction, high-school dropout prevention, or technology infusion. Some projects emphasize parent and community engagement; specific academic disciplines such as literacy, mathematics, or science; or transdisciplinary topics that allow secondary humanities and science faculty to collaborate on local ecologies and their histories, for example.

In addition to the diversity of their content areas, AISI funding supports variegated district-level and school structures. Some are relatively centralized change initiatives—in which four full-time AISI consultants work together with a technology expert from a district office, for example—while others represent more diffused models of change, in which large numbers of teachers dedicate one-fifth of their time in their buildings to AISI projects while directing the other four-fifths of their time to the traditional instructional tasks of a classroom teacher. Most projects supported PLCs among classroom teachers, but other districts have gone further by creating PLCs for administrators to provide them with similar structures to promote organizational development. In rural communities, PLCs can stretch across schools by bringing together grade-level teachers to share challenges and swap potential solutions with one another over time. AISI's change architecture allows districts and schools to evolve their project foci and structures, with the three-year cycles providing regular interludes for reviewing previous activities and striking out in new directions.

The creative and bottom-up possibilities embedded in AISI's change architecture explain the universal enthusiasm for AISI of project participants. One charter school educator commented that "The whole structure of AISI is actually great, because it keeps a lot of actual freedom in how you are going to work on your project. And that really allows for so much involvement, individual involvement of people, they feel part of it. Like you're part of the process." Educators referred consistently to the value they placed on AISI as a network that granted them freedom to address all of the complexities of their everyday classroom lives while also providing supports to develop long-term change strategies in their buildings. This ability to participate in ground-level theorizing about long-term goals, and to acquire the professional development that would enable educators to set structures and processes in place, puts AISI at the forefront of contemporary efforts to overcome educators' "presentism" or short-term thinking, a problem long recognized as a central impediment to organizational learning by sociologists of education.

The freedom and creativity AISI extends to its participants is accompanied by a strong accountability component that requires all projects to complete annual reports as well as more detailed analyses at the end of each three-year cycle. These accountability components require educators systematically to gather data about the nature and types of interventions and project outcomes as well as of the number of students impacted and the number of staff involved in the projects. Many informants complained that the amount of detail required by the reports was excessive, but most also understood and appreciated that in the current policy climate emphasizing accountability, educators can no longer expect to receive funding without evaluation and reflection being built into the project design. In addition to the project-level reports conducted by educators in districts and schools, rigorous external reports conducted by university faculty document AISI impacts both as an aggregate as well as for special groups such as parents and First Nations, Métis, and Inuit students. Educators stated that these reports, printed by Alberta Education in reader-friendly, well designed formats, gave them "a jumpstart to what you want to do … Instead of having to go to the great pool of research that is out there, you actually have sort of a head start into what is working."

In addition to locally-generated and driven school improvement—characterized by educators as "grassroots" in nature—AISI has fostered networks of districts coming together through cross-site visits and regional and provincial AISI conferences. These events enable educators to learn from each other's work and to hear outside speakers and consultants who inform them of new research findings that are relevant to their everyday classroom interactions with students, colleagues, and parents and community members.

Many informants spoke of the power and importance of outside consultants with solid research records as well as practical experience in real schools and classrooms in inspiring their thinking.

Educators asserted that AISI's change architecture helped them to learn to think about themselves as researchers. Through AISI project leaders and consultants, teachers learned to use appropriate tools and methodologies to improve their instruction. One appreciative teacher stated, "AISI I feel has helped our teachers—has almost given them more importance because they are part of the research team, and they've had to learn about researching skills."

Three topics emerged in the course of the interviews and focus group discussions that AISI may wish to address in relationship to its change architecture. First, most informants wanted additional help with effective strategies for improving parent and community engagement. Second, some educators indicated that they were overloaded with new projects and needed assistance with reviewing and abandoning outdated programs. Finally, more explicit attention to leadership development may be warranted.

2.2 What is the value of AISI? (What are the values of AISI?)

Informants agreed that AISI is catalyzing authentic and deep conversations about teaching and learning that are contributing to a richer repertoire of instructional practices and improved student achievement in Alberta. They credited AISI with giving them new ways to observe student learning, identify obstacles to achievement, and revise instruction so that their students learn at high levels. None of them viewed AISI as a distraction (with the single exception of what they viewed as excessively onerous accountability requirements). The educators and all of the parents interviewed credited AISI with creating grass-roots level excitement about teaching and learning, and with activating educators to develop their own needs assessments and pilot projects to address the needs of their own schools and communities.

These achievements of AISI are especially noteworthy given the extensive research literature that documents the ways in which many school cultures exacerbate teachers' conservatism, individualism, and short-term thinking or "presentism." (Cohn & Kottkamp, 1993; Little, 1990; Lortie, 1975). By exposing educators to alternative sets of practices and by embedding ongoing support into schools through AISI-funded lead teachers and consultants, AISI has helped to overcome teachers' conservatism and to re-ignite their curiosity about new and better ways of teaching their students. The many PLCs and AISI teams that have been constituted in project elementary schools seem to have replaced individualism (also called "privatism") with a more collective understanding of peer learning and exchange, although many secondary schools generally still exhibit faculty identification with individual subject matter expertise more than a collaborative approach to foundational issues of teaching and learning.

As a consequence of these positive attributes that combine both professional expertise with public democracy, educational leaders continually stated that the return on investment with AISI is superb. When superintendents were asked point-blank whether they would prefer unencumbered funds or those specifically designated for AISI, they all preferred the latter, asserting that AISI consultants, values, and networking opportunities possessed high value for their jurisdictions. Likewise, not one classroom teacher interviewed perceived AISI as an unwanted imposition or a fad. Whether they were superintendents, principals, or teachers, no informants stated that they would be able to make better use of AISI funding in their districts if it were given to them with no strings attached.

2.3 Is it possible for jurisdictions to do these projects and activities without AISI?

Many educational leaders stated that they had numerous previous projects—related to technology use, anti-bullying initiatives, character education, or differentiated instruction—that in many ways manifested the same core humanistic values that they identified in AISI. They viewed these values as oriented around a child-centered philosophy of education that included children's subjective well-being as well as their academic success as part of the core mission of their schools and districts. To this degree, AISI may be viewed as an extension and amplification of principles that districts already possessed. Educators tended to view AISI not so much as the point of departure for new values, but rather as a funding source that enabled them to realize the values that they had always had but often became diluted in the press of events.

When questioned about AISI and funding, one superintendent commented, "We could have done it without the encouragement, but not without the funding … we're the kind of district that doesn't need to be pushed to do things. But without the funding, for sure, more difficult." A charter school principal was crystal clear: "Without the funding, we couldn't afford it ourselves."

Districts needed funding to support AISI consultants, to provide teachers with release time to learn from their colleagues, to purchase resources, and to send teachers to professional development activities such as the annual conferences of the Alberta Assessment Consortium. In remote rural districts, the opportunity to leave one's small town and to learn about recent research findings at AISI or AAC conferences was especially cherished. AISI funding for rural districts was viewed as a vital lifeline to gain access to new ideas and research findings in education and to establish lateral learning networks with other educators with more experience in the practical implementation of the findings.

There is evidence of school divisions sustaining projects beyond AISI funding, which tells us that it may indeed be possible that the jurisdictions could have done these innovative projects and activities without AISI. Some districts institutionalized lead teacher, project leader, and consultant positions at the completion of a given AISI cycle. AISI provided an effective career ladder for many teachers by giving them a chance to identify a special area of expertise, hone it in collaboration with colleagues, and eventually acquire the confidence and skills to take on roles as AISI project leaders in their buildings or coordinators or consultants in their districts. Since some districts began implementing meso-level policy changes such as assessing principals based on their efficacy at embedding practices from AfL in their schools, AISI actually seems to have become something of a misnomer—not so much sponsoring initiatives as embedding new norms and expectations.

2.4 Would the values of AISI continue without funding?

Many participants from elementary schools said that the cultures of their schools had changed and that the practices that came about due to AISI were now embedded in their schools. They stated that while AISI was indispensable in catalyzing change, AISI values were now embedded in their schools and would continue without funding. Secondary school principals and teachers, on the other hand, could point to individual departments or clusters of faculty that had changed, but also acknowledged the presence of reluctant faculty in their schools. For them, AISI values still required funding to enhance a larger cultural shift towards a greater focus on student learning.

Several high school principals stated that they were now on the cusp of reculturing their schools to help teachers to discover new ways to engage their students and improve high school completion rates. These principals were exploring innovative ways of teaming faculty across disciplines and embedding supports in PLCs that help faculty to overcome the initial obstacles that they encounter in modifying traditional instructional, curricular, and assessment practices for struggling learners. Research (Hargreaves, 1994; McLaughlin & Talbot, 2001; Muncey & McQuillan, 1995) indicates that high school faculty generally need continual, classroom-based support from colleagues and outside consultants to shift the focus of their attention from the transmission of their disciplinary expertise to their students' learning styles. For AISI values to continue to spread at the secondary school level, then, continued funding is likely to be necessary for its projects in high schools, especially if Alberta is to succeed in improving high school graduation rates.

2.5 Has AISI changed the culture of education in Alberta? If so, how has it?

For many informants, the dominant culture of education in Alberta is defined by student achievement results on the Provincial Achievement Tests (PATs). Educators knew that the public dimension of their students' achievement results reflected on them and that poor years resulted in defensiveness and loss of morale and good years built confidence and momentum. They knew that their province has been the highest achiever in Canada on national and international tests for many years, and that these results in many ways have come to give Alberta a unique educational identity as perceived both by insiders and outsiders. Even when educators disliked the PATs and were articulate about their limitations, they still defined themselves in many ways by them, as this principal's remarks convey: "I would say that I'm proud of the fact that once we won the award for the fastest improving school in the province, and two or three other times we've been nominated to be in the top 15 schools in the province according to their measure. But it's not a measure that I agree with and support."

On the whole, we observed a familiar phenomenon in regard to the multiple perspectives that surfaced in our interviews: superintendents were by and large the most enthusiastic about the PATs; principals were critical, but not overwhelmingly so; and classroom teachers considered them to be a distortion of the learning process, especially at the elementary school level.

Intentionally or not, AISI's change architecture has led educators to question and in some instances to challenge the logic of Alberta's PATs. When this occurs, AISI is indeed changing the culture of education in Alberta by shifting educators' focus from summative to formative assessments, with the attendant learning opportunities that the latter implies. Educators value AISI because it provides them with the sanction and financial support of Alberta Education to raise larger questions about teaching and learning that go beyond test-preparatory activities--and to modify their practices accordingly. AfL was especially praised by educators in AISI project sites. They stated that AfL has helped them to work more closely with students to develop criteria of excellence in their work, to provide models of excellence, and to persist with students in revising their work until all students have demonstrated excellence.

Educators reported great "psychic rewards"—a key feature of job satisfaction for teachers in their teaching after adapting new strategies that allowed all of their students to achieve at high levels. As a result of AfL in particular, one AISI consultant stated, "Teachers are engaging in a variety of assessment strategies that are meeting a variety of needs of students … they're really triangulating the evidence … making observations, listening to conversations, and product work … it's been huge. And we're going in such a great direction, right now, that it's really exciting."

AISI educators reported that their students quite literally are "empowered" through practices such as those promoted by AfL and they are eager to disseminate them to other teachers and schools. Yet one perhaps unintended consequence of AISI's success with AfL is that aspects of the PATs such as multiple choice items, time limits, lack of access to dictionaries or "word walls," and single chances to demonstrate knowledge with pre-established testing formats appeared to educators and students to conflict with the new culture of teaching and learning that AISI is disseminating in Alberta through approaches such as AfL. For those educators who had most internalized the research findings associated with AfL, their work with AISI was vital and urgent in advancing a broader understanding of teaching and learning that they believed held greater promise for those children traditionally marginalized by orthodox schooling practices.

3. Conclusion

AISI is now at the cutting edge of precisely these kinds of changes that move beyond individual initiatives and opportunities into a deeper "Fourth Way" of educational change with a carefully calibrated blend of both innovation and sustainability. Teachers have acquired new skills as researchers and micro-level policy makers who identify problems in children's learning, collaborate with colleagues to formulate potential solutions, and then acquire funding, skills and support to put their professional knowledge to work. Educators have side-stepped the kinds of short-term strategies that lead to "gaming the system" to get test scores up and instead are asking far more radical and profound questions of themselves and of their colleagues. They are challenging each other to work with students to establish agreed-upon criteria for excellence in learning and are providing children with multiple venues for acquiring and demonstrating excellence. They are embedding technology into a repertoire of instructional strategies that presumes agency and intelligence on the part of learners and intentionality and purpose on the part of educators. They have become accustomed to the idea that their long-term vision of educational change matters and plays a role in shaping the future policies of their province.

The importance of building ownership at having people really part of determining their fates as a key theme in AISI has given districts a participatory and inclusive dimension that is a striking exception to a more common relationship of guarded caution or even outright antagonism that exists between school-level and district-level authorities in many jurisdictions (Bryk & Schneider, 2002; Payne, 2008). In our interviews and focus group discussions the research team was struck by the highly iterative and porous relationships that characterized school and district-level staff engaged in AISI projects. Teachers have multiple opportunities to advance project activities at the district level and central-office administrators are welcomed to participate in shaping the daily life of schools in creative and innovative ways that go beyond the implementation of new mandates and programs. The new emphasis on studying and then applying research findings is creating a common respect for the intellectual demands of the teaching profession and the responsibilities of educators at all levels to stay abreast of educational scholarship.

The research findings from these 12 case studies indicate that AISI enjoys enormous popularity among educators and is credited with helping them to advance their skills as thinkers, researchers, and practitioners. At the same time, some lacunae need attention. First, to continue to advance, AISI will need to find new ways to engage parents and community members. In most instances, educators readily acknowledged that they had trouble engaging parents of students and especially those students who were often absent from school. They welcomed the emphasis on parent and community engagement in AISI Cycle 4 and were looking for new ideas to improve in this area.

Second, AISI may need to find ways not only to *add* new opportunities for educators to enrich learning, but also to advise educators to *abandon* projects that have outlived their usefulness and are not appropriate for the challenges that lie ahead. One principal expressed enthusiasm for AISI in general but also complained that "the common comment from most teachers is that we've brought too many projects. 'Projectitis' is going on." While this was not a commonly heard sentiment from educators, in this particular district it appears that district leaders needed technical assistance in developing as well as casting off projects. In such districts, the merits of abandonment may need to be considered by AISI leaders in the years ahead.

Third, AISI's great strength—educators' enthusiasm for work that they themselves can initiate and drive in the way that they believe best meets the needs of their schools and communities—may need to be bolstered with a more explicit theory and practice of leadership development. In many ways, a great deal of ferment in relationship to leadership is already occurring in AISI sites. One AISI coordinator discussed how themes such as "teacher leadership research, the change process, and looking at resistance to change" were prominent themes in AISI team meetings in her jurisdiction. "What we're doing is trying to build up a leadership capacity piece. The administrative PLCs that were established in some of our districts addressed similar themes related to leadership, indicating that within AISI, leadership is emerging as an important topic for future inquiry and development."

Interviews with teachers revealed a remarkable lack of rivalry about the evolution of new leadership roles that is sponsored by AISI projects. There seemed to be a tacit understanding that taking on leadership responsibilities or becoming involved with innovation was admirable and that as professionals, teachers are obliged to exercise leadership in multiple domains simultaneously. Because teachers' "privatism" has eroded with support from AISI, teachers are able to support one another in their growth as leaders across traditional disciplinary and sector boundaries.

If AISI wishes to generate new models of teaching and learning in the future, it is likely to need a more explicit theory of leadership development and capacity enhancement. Some innovations, for example, may require *even more* networking opportunities among and across district boundaries, thereby strengthening what complexity theorists term the "robustness" of decentralized networks. Such innovations can challenge the norms of groupthink that settle too quickly into established norms of reflection and action. An innovative spirit expressed through new forms of teaching and learning can ensure that the school and the district remain learning organizations that are willing to tolerate a certain amount of stress and pressure as part of the necessary cost of growth and change.

The cumulative evidence from this qualitative case study is that AISI is providing a vital catalyst to Albertan education that far exceeds its actual funding. The universality of educators' appreciation for AISI as a change network is impressive and cuts across roles and relationships. The topics of parent and community engagement, abandonment of themes and strategies that are no longer priorities, and an explicit theory and practice of leadership are three areas that AISI may wish to address as it now prepares for the fourth cycle. These topics should be seen in light of AISI's impressive achievements that have promoted educational professionalism, capacity enhancement, the study and application of research, and the dissemination and generation of new knowledge throughout Albertan education.

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Chapter 5: The Four Ways of AISI

By Andy Hargreaves

1. Introduction

In today's rapidly changing and volatile world, it is no longer enough to achieve and exemplify world-class standards and even to be an international leader on measures of educational attainment –important and admirable as these things are. Learning more and learning better are no longer enough – even and especially in one of the highest performing systems in the world. This is a time when we must also start to learn differently. As my colleagues and I have seen in our assessment for OECD of Finland's much-lauded educational system, what makes a system successful by current criteria does not guarantee sustainability of that success when the criteria start to change (Hargreaves, Halasz, & Pont, 2008).

A successful system is a learning system. It anticipates its way forward and responds to the challenges of the future. Sometimes we have to fix things before they are broken. We have to start running the race differently even when we feel we are way out ahead. This is particularly true when the terrain starts to change. In the 21st Century, the terrain is changing in seismic proportions in almost every aspect of our lives. The result is four major change imperatives:

- the aftermath of global economic collapse that has created an *economic imperative* of developing 21st Century skills for an innovative and creative economy and of doing so with fiscal prudence (El Elrian, 2008);

- the spread of excessive affluence that has reduced the quality of most people's lives, and given rise to the *social imperative* of developing better lives and wellbeing for all, especially at a time of growing cultural and linguistic diversity (Wilkinson & Pickett, 2009; UNICEF, 2007);

- the impact of climate change and energy crises that threaten the survival of our species and that raise the *ecological imperative* of producing both innovative technological solutions as well as changes in lifestyles towards education for more sustainable living (Capra, 2005; Giddens, 2009).

- the generational renewal of the workforce with the Boomer generation being replaced by Generations X and Y whose approaches to life and leadership are more swift, assertive, direct, team-based, task-centered and technologically savvy raising the *generational imperative* of capitalizing on these assets to develop and distribute more skilled and responsible leadership in our schools (Howe & Strauss, 2000).

All system-wide educational change efforts must address these imperatives. Yet there is no single approach to educational change and reform. Approaches vary across the country, internationally and over time. They can and do address the four imperatives in different ways and with different degrees of adequacy.

There have been four general approaches to or ways of educational and social change in many of the developed countries in the past 50 years (Hargreaves & Shirley, 2009). Though the identification of these Ways is solidly grounded in social theory (Giddens, 1999), and also in the findings of my own research on educational change over time in Canadian and US high schools (Hargreaves & Goodson, 2006), for pedagogical purposes, these Ways can be likened to the mythical properties commonly attributed to the four planets of the inner solar system: Venus, Mars, Mercury and Earth.

This chapter reviews the different reform directions represented in these four Ways of Change, and assesses their strengths and limitations in relation to the four imperatives of the early 21st century. It then examines in what ways AISI resembles aspects of these Ways in its past or present practices and in its future potential. By undertaking this exercise, we will then be able to determine more carefully what potential AISI can draw on and what fears and doubts it can reignite from past periods or Ways of reform with which it appears to bear resemblances. We can see where it fits with and where it departs from other reform patterns – what strengths it can build upon, what flaws it might be in danger of repeating, and in what ways it can and should take the lead.

2. The Four Ways of Change

2.1 The First Way of Venus

The First Way of Venus stretched from the end of the Second World War and especially from the 1960s to the mid 1970s. Economist John Maynard Keynes and his followers presented investment in state services and welfare safety nets not just as a social good but also as a benefit for the economy as it developed the pools of talent that would fuel future prosperity. There was immense confidence in the state's ability to solve social problems, fueled by a booming economy and spurred by the rising Baby Boomer population.

In the latter years of this age, a rebellious and creative spirit entered public schools in the form of experimentation, innovation, and child-centered or progressive teaching. Teachers and other state professionals had great autonomy in the First Way. They enjoyed high levels of passive trust from an increasingly prosperous public and were largely left alone to get on with the job.

Teachers today are sometimes nostalgic for the freedom to develop curricula to meet the varying needs of their students as part of a mission to change the world but some of them bemoan the loss of their professional autonomy more because they could teach their subjects just as they chose (Goodson, Moore & Hargreaves, 2006). The First Way of Venus therefore suffered from huge variations in focus and quality of provision and also standards. Teaching was improved largely intuitively and individually, through improvisation, on the job.

Teachers from this period remember their principals as larger than life characters who left their stamp on the school, but not always in a good way. The kind of school in which teachers taught therefore depended on this lottery of leadership within an unregulated profession of little and only local accountability. The First Way brought innovation but also inconsistency. There was no leadership development or professional development to create widespread consistency of impact or effort. Love was not enough.

The First Way left a legacy of the importance of innovation but within and between schools, innovation occurred only in scattered islands – not in continents or even archipelagoes. Leadership made the biggest difference to the success of innovation, but good leadership was not a focus of investment. It was a matter of luck or chance. Trust in educators as professionals was real; but sometimes this trust was blind or misplaced.

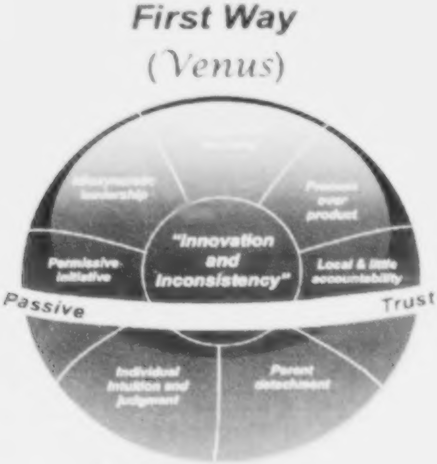

Figure 5.1 The First Way of Venus

The Alberta Initiative for School Improvement is about innovation as well as improvement. It supports local changes and initiatives, compared to centralized or standardized mandates. It invests high trust in the professional judgments of teachers and principals. There are many resonances of the First Way of Venus in the orientations of AISI. More mature educators still in the system who are nostalgic for the professional freedoms of the '60s and '70s can value AISI's resurrection of a professional culture of self-directed innovation and even improvisation, and its reigniting of their passion for teaching. They might regard it as a recovery of respect for professionalism that had been lost.

At the same time, morose and gloomy educators (of whom the research team sometimes heard but never directly met) may recall the incoherence and inconsistencies of the 1960s and 1970s and have a saturnine skepticism towards locally-driven initiatives like AISI instead. An overly enthusiastic celebration of self-determined innovation and of qualitative rather than quantitative approaches to accountability also always runs the risk

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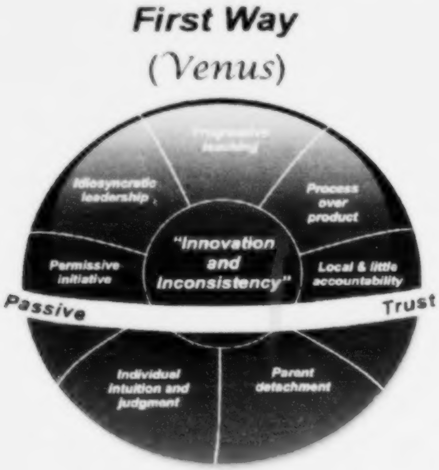

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Cycle 1 of AISI embraced much of the individual school innovation that characterized the First Way of change, but also, as in the First Way, it seemed to achieve insufficient coordination among these many bottom-up initiatives. The challenge for AISI, always, is how to recapture the innovative spirit that characterized some of the best practices of the First Way, without repeating or retreating to the excessive amounts of inconsistency, the lack of demonstrable standards or clear accountability, and the absence of consistently high leadership capacity that were also widespread throughout that period. AISI's ever-present challenge, in this respect, is how to balance and reconcile professional creativity and organizational complexity with system coherence and accountability.

2.2 The Second Way of Mars

Because of the onset of economic stringency, and of tougher questions therefore being asked about value for money in the use of tax dollars, a Second Way followed of market-competition and standardization as developed nations headed into the 1980s and '90s. With long gas lines and economic recession, coupled with a maturing labor force in teaching that was becoming more expensive, people began to question whether the state was still the answer to everything. Many Anglo-American nations placed schools in more competitive systems of market choice for students and their parents. The currency of this market was more-and-more detailed standards, linked to high stakes tests that were widely publicized in league tables of performance and often combined with weakened levels of resourcing, and accelerated timelines for implementation. Planning and implementation processes became more systematic and detailed, and driven from the top. Charter schools and their international equivalents also began to emerge, though less extensively in Alberta than south of the border.

Some benefits of common standards, increased accountability and inter-school competition were evident in the emergence of clearer focus, greater consistency, and attention to all students with a stronger sense of urgency. Outside Alberta, drawbacks of the Second Way of Mars also began to emerge quite quickly (Hargreaves, 2003). While achievement gains often occurred for a year or two, they soon reached a plateau. Parents had more choice, but it was the affluent ones who knew how to work the system to advance their interests and protect their privileges. The passive trust of the First Way was replaced by active mistrust between teachers and the public in the Second. Standards raised the bar but shortfalls of professional support, due to diminished educational investment, did not help children reach it. The costs to the quality, depth and breadth of children's learning, to increased dropout and reduced innovation, as well as to the caliber of teachers and leaders the profession could recruit and retain were considerable (Nichols & Berliner, 2007; Oakes & Lipton, 2002; New Commission on the Skills of the American Workforce, 2007).

In the Second Way, leadership was seen as overloaded, unattractive and excessively exposed in the context of punitive accountability. Leadership had turned into line management. Teachers saw their leaders as managers who had forgotten how to lead. Their principals rotated in and out of schools with increasing frequency and seemed to have more attachment to implementing government priorities or advancing their own careers than serving their own schools locally (Hargreaves, 2003; Fink & Brayman, 2006).

Alberta was arguably the first province to enter the Second Way in Canada. Its Student Evaluation Branch (now called Learner Assessment) developed extensive and sophisticated instruments of testing and accountability. At the same time, the teaching profession has been more extensively and inclusively involved in designing and implementing the provincial achievement tests (PATs) than in any other jurisdiction in North America.

There are undoubtedly tensions between the First Way feel of AISI in its promotion of locally developed innovation and improvement efforts in relation to a wide range of outcomes, and the Second Way-like emphasis of the provincial accountability system and its support for PATs connected to a more closely defined set of outcomes. In this review, we found that the closer to the classroom that educators are in their roles and responsibilities, the less supportive they are likely to be of the PATs. The views of senior district staff are the most favorable, the reviews of principals are more mixed, and the responses of classroom teachers are consistently critical. PATs can give administrators leverage with teachers and change and they can also enable them to respond to a range of stakeholders whom they must routinely meet. Classroom teachers, by contrast, sometimes acknowledge the need for PATs or something like them, but regard their presence within AISI as being one of distortion of and distraction from the different learning and improvement goals that they feel AISI projects are trying to achieve.

In general, the quantitative component of this multiple perspectives review finds no strong association between AISI project initiatives and PATs. Reassuringly perhaps, at a time of significant population changes in many of Alberta's schools, there is no evidence of AISI being associated with any deterioration in PAT scores, and indeed, there are indications that AISI may be related to small PAT gains in subjects like mathematics at times when the provincial PAT average has been falling.

Overall, the rigorously conducted quantitative analysis concludes that it is extremely difficult to demonstrate associations of any kind between AISI projects or AISI as a whole on the one hand and PATs on the other. This is because:

- those associations that have been uncovered often appear to be statistical artifacts such as regression to the mean;
- there is wide variability in AISI projects or treatments which makes it hard to group them together;
- AISI is now so deeply embedded in and hard to disentangle from the overall policy and practice of the Alberta education system that it is hard to isolate AISI as an independent effect;
- many AISI projects goals and emphases are not directed at increases in PAT scores, or at improvements in subjects or areas of learning that the PATs measure;

- PAT data are collected in other ways for other purposes than those associated with AISI projects, making it difficult to track AISI's impact on particular cohorts of students.

In conjunction with the four imperatives that opened this chapter, the results of the quantitative analysis raise significant questions about the prominence and pre-eminence of PATs within the provincial system of Alberta education as a whole, and about the role and influence of PATs within AISI and AISI projects in particular.

As we come towards the end of the first decade of the 21st century, there is evidence of a worldwide movement in the developed countries away from current levels of system-wide, standardized testing. In some places, such as Nova Scotia, within the context of an economic recession, elimination of system-wide standardized tests is a simple result of cost-benefit analysis: the tests are seen as "not worth the costs" (Hargreaves & Shirley, 2009). In others, alterations to the system are seen as essential in order to develop the greater creativity and innovation in teaching and learning that are integral in developing 21st century skills for an advanced knowledge economy. This is evident in US moves to develop different testing systems and testing items (New Commission on the Skills of the American Workforce, 2007) and also in Finland's commitment to testing and accountability through the use of confidential monitoring by samples in order to preserve the flexibility and professional trust central to remaining the world's most competitive economy (Hargreaves, Halasz, & Pont, 2008; Sahlberg, 2006). Finally, system-wide standardized testing has been abandoned in Wales, and has seriously abated to the point of almost complete elimination in England due to mounting parental, public and professional criticism about the impact of testing on enjoyment of and engagement with learning and school, especially among younger children (BBC, 2009). The recent passing of Motion 503 in the Alberta legislature shows movement in the same direction.

Within AISI, PATs are widely used as measures of accountability and indicators of impact. This seems to be more because they can be easily accessed and rapidly employed, than because they are regarded as a useful valid measure of project impacts. The extensive accountability requirements of AISI are seen as overwhelming by many AISI schools. An easily used measure can be a seductive option for busy teachers, even when it is less appropriate than a more time-consuming, self-developed one. At the same time, the review team did not encounter systematic efforts to train teachers and schools in designing valid and reliable indicators of progress that were more coherently related to their own project goals. One possible way forward may therefore be to build the capacity of teachers, schools and districts to develop and deploy their own rigorous instruments of accountability as a way of inquiring into project impact and also meeting their accountability requirements externally.

Last, as the Second Way of Mars leaves a legacy of widespread use of standardized achievement testing as a method of assessing progress and impact, it also leaves a further legacy of linear and time-bound processes of planning, development and review linked to cycles of funding administered from the top. In the next chapter, Pasi Sahlberg, in his response to the reviews, raises questions about a project-based approach to AISI, divided into three-year cycles of funding. This, he says, can tend to fragment AISI projects into relatively short-term initiatives that do not embed or integrate into the system or build on one another (as AISI nonetheless encourages project leaders to do). It may also explain why districts like Sumara and Davis' "Arrowhead", that have a more top-down and linear, Second Way approach to planning and implementation, tend to choose a focus for AISI related to a provincial thrust and direction, backed up by trainers and training packages.

Second Way thinking about planning and accountability may not be well suited to the further development of AISI and its culture of local improvement and innovation in particular, or to the worldwide move to develop more flexible school systems that can cultivate the 21st century skills of creativity, innovation, and flexibility that are essential for advanced knowledge economies. This does not and should not mean abandoning commitments to rigorous processes of planning and accountability in favor of a return to the local inconsistencies of the 1970s. But it does mean rethinking how planning and accountability within AISI and outside it should be reconstructed in the more complex, fast-moving and innovation-oriented cultures and systems of the 21st century.

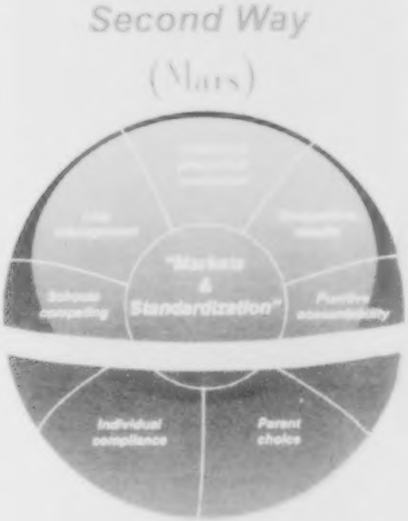

Figure 5.2 The Second Way of Mars

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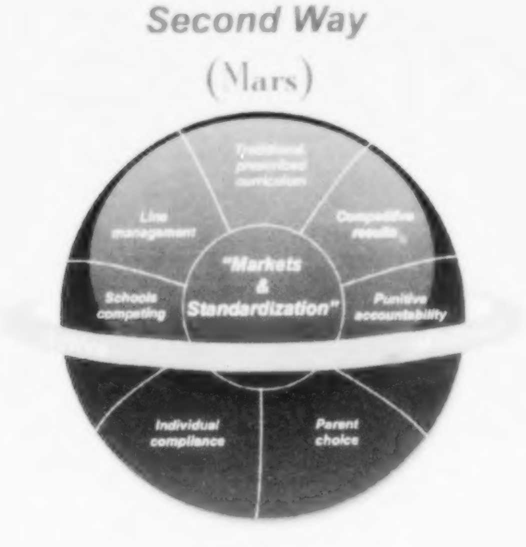

Figure 5.2 The Second Way of Mars

2.3 The Third Way of Mercury

A new Way is needed that can keep an eye on coherence and consistency, and retain the sense of urgency about learning and achievement for all students, while also maintaining AISI's positive impacts of professional growth and energy, as well as developing the higher levels of creative learning and skill development that are essential for competitive economies and cohesive societies. In this Third Way, 21st Century skills and systems take on particular prominence.

The 21st Century skills agenda has its origins stretching back more than thirty years to the work of Daniel Bell (1976) who first invented the term *knowledge society* to describe a post-industrial world that would require an educated workforce capable of working in services, ideas and communication. Since then, management gurus and futurists (e.g. Toffler, 1990, Drucker, 1993), educational reform advocates (e.g. Schlechty, 1990; Hargreaves, 2003; Wagner, 2008; Zhao, 2009), high ranking government leaders (e.g. Reich, 2001), national think-tanks and partnerships (New Commission on the Skills of the American Workforce, 2007; Partnership for 21st Century Skills, 2009) and international organizations (e.g., OECD 2001, 2008) have argued for the development of 21st century skills in knowledge society schools that will promote innovation, creativity, flexibility, adaptability, problem-solving, critical thinking, lifelong learning, ingenuity, collective intelligence, teamwork, risk-taking and continuous improvement.

21st Century skills are part of a Third Way of educational reform – neither child-centred and permissive, nor basic and standardized. Instead they are like the winged messenger of Mercury - characterized by speed and communication that suits a modern world of information-driven profit, trade and commerce. This promotes economically useful cross-curricular skills in learning; new patterns of professionalism as well as professional interaction and networking among teachers; and more rapid and flexible ways of managing change in organizations.

This Way of Mercury directly addresses three of the four 21st Century imperatives outlined earlier. It develops the skills and processes that accelerate the innovation and knowledge circulation that are vital for regenerating a floundering economy. This culture of innovation and ingenuity is equally indispensible in dealing with the environmental challenges of climate change and energy shortages. Engaging with the digital and attitudinal realities of 21st Century learners also appeals generationally to students and their younger teachers who have been born digital.

Although it is important to be realistic and acknowledge that not all the work skills of the 21st Century will be 21st Century skills and that many of today's middle class are consigned more to the routine cubicle work that is reminiscent of TV's *The Office*, than the high-powered corporate judgment and problem-solving of *The Apprentice* (Crawford, 2009), the Third Way of Mercury does set a new agenda of student skills and patterns of judgment and decision-making that are required in complex, fast-moving, flexible, information-driven organizations.

This Third Way of educational and social reform sits between and beyond the state and the market (Blair & Schroeder, 1999; Giddens, 1999). In the Third Way, there is stronger support for state professionals at the same time as a demand for more accountability from them. State requirements persist, and these are now commonly expressed as market-like performance targets. Services offer more choice and flexibility for clients and consumers. The most distinctive feature of the Third Way, perhaps, is its infusion of greater lateral, professional energy into the process of change and improvement (Hartley, 2007). More resources and energy are invested in professional development and involvement, in constructing professional learning communities of collaboration and teamwork often around data-driven improvement agendas, and in constructing networks of professional learning and interaction between and across schools as ways to build motivation and spread innovation.

The Third Way of Mercury offers flexible and customized pathways for students' learning in school and for professionals' engagement in improvement within their organizations. Unlike the Second Way of Mars, one size no longer fits all. AISI offers just such localized pathways of innovation and improvement, not in the completely open-ended sense of the First Way, but more typically now in relation to a guided set of priorities.

Since Cycles 2 and 3, AISI's approach has been increasingly collaborative, particularly within districts, and one of the priorities of Cycle 4 is to encourage collaboration across districts too. Networks look different depending on whether they work on First, Second or Third Way principles. First Way patterns of interaction are open-ended and not especially accountable for results. Second Way networks often operate more like clusters of schools drawn together on training days or for consultation purposes to facilitate implementation of government or district priorities. This is how interaction across schools seems to operate in the Arrowhead district discussed by Sumara and Davis in their chapter, for example. Third Way networks are much more complex. They are systems held together or given connectivity by clear and common purposes, personal trust, strong relationships, and frequent interaction as in Sumara and Davis' Pathways district.

All networks have an architecture but not all network architectures are equally effective (Hadfield, 2009; Hargreaves & Fink, 2006). Networks are based around particular kinds of conversations and activities; they have rules of inclusion and exclusion; are defined by specific or less specific purposes; they are articulated by designed patterns of interaction through meetings, visits, website interfaces, or conference gatherings; and they are characterized by strong or weak forms of accountability of participation and results.

I recently evaluated one especially effective network in terms of its impact on achievement results with Dennis Shirley and some colleagues (Hargreaves & Shirley, 2009). The network comprised over 300 secondary schools that had experienced a dip in student achievement scores over one or two years. It promoted improvement by schools, with schools and for schools in peer-driven networks of lateral pressure and support, where participating schools were connected with each other and with self-chosen mentor schools, and invited to conferences that supplied them with inspiration, technical support in analyzing achievement data, as well as a menu of short, medium and long term strategies for improving teaching and learning and also achievement results. The network's architecture emphasized transparency of participation as well as of results in which different levels of performance, participation and success were visible to all.

In Cycle 4, AISI plans to make significant strides in networking across districts as a way to spread innovation and disseminate improvements across district boundaries. As it does so, it would be advised to move beyond First Way principles of permissive sharing and celebration of practice alone to promoting more critical conversations among schools about practice, and to finding ways to honestly acknowledge and identify different levels of competence or stages of development in the initiatives being tried or in the capacity to support them, so that networks can operate as clear and targeted forms of assistance where needed as well as mechanisms to exchange ideas and strategies.

Elsewhere, some contemporary system-wide networks try to meet accountability requirements by connecting network emphases and activities to direct improvements in achievement results. In these cases, Third Way networking strategies are tightly tied to the continuation and even intensification of Second Way emphases on short term achievement results. This connection can sometimes lead to a narrowing of focus in networks to easily tested basics, or to short-term and relatively superficial interventions that secure rapid achievement gains – undermining longer-term and more ambitious efforts to transform teaching and learning for the 21st century. This attachment of networking to short-term achievement results is often linked to the availability of data systems that highlight gaps and difficulties on a just-in-time basis and to the pressures to demonstrate system-wide results emanating from short-term election cycles. In recent years, these kinds of network patterns have been especially evident in England (Barber, 2007) and Ontario (Fullan, 2005).

One of Alberta's great strengths is its high degree of political stability that it shares with other international high performers such as Finland and Singapore. This releases the province and also AISI from more intense political pressure to demonstrate the immediate impact of initiatives like AISI on PATs. Instead, the province can concentrate on the longer-term goals of transformation while developing clear accountable indicators of the progress being made in achieving them. However, the continuing organization of AISI into three-year project cycles poses a risk to these longer term goals and the more challenging interactions and transformations they will require from teachers – beyond implementing particular training packages, for example.

AISI and the Third Way of Mercury are and should be innovative and flexible, as well as quick and agile. They also need to ensure that they maintain a longer term and sustainable vision as well as a short or medium term one, and that they address the needs and goals of the social and ecological imperatives as well as the predominantly economic ones.

AISI and the Third Way of Mercury offer immense promise for innovation, improvement and professional growth compared to the standardization and professional exclusion that often characterized the Second Way of Mars. And they embrace creativity, professionalism and local determination without regressing to the incoherence and inconsistency of Venus. AISI and the Third Way can be pushed harder into longer term transformation for competitive knowledge economies; into a wider social agenda; and into forms of robust accountability that extend beyond the existing province-wide instruments of standardized testing. Such moves would push AISI further into a Fourth Way of change – the sustainable way of Earth.

Figure 5.3 The Third Way of Mercury

2.4 The Fourth Way of Earth

The Fourth Way begins with an inspiring and inclusive mission beyond higher standards or test scores alone. Teaching and learning in the Fourth Way are engaging and mindful, and so is the learning of professionals (MacDonald & Shirley, 2009). This learning is often reflective and ruminative. It is not always agile and quick. Indeed, says psychologist Guy Claxton (1997), it is this very kind of learning that is essential for developing creative thought.

Fourth Way schools act urgently in the present in order to protect and sustain the future. Their short-term goals are connected to long-term commitments. And the targets are shared and owned by them, not politically imposed from elsewhere. As in Finland, collective responsibility precedes external accountability.

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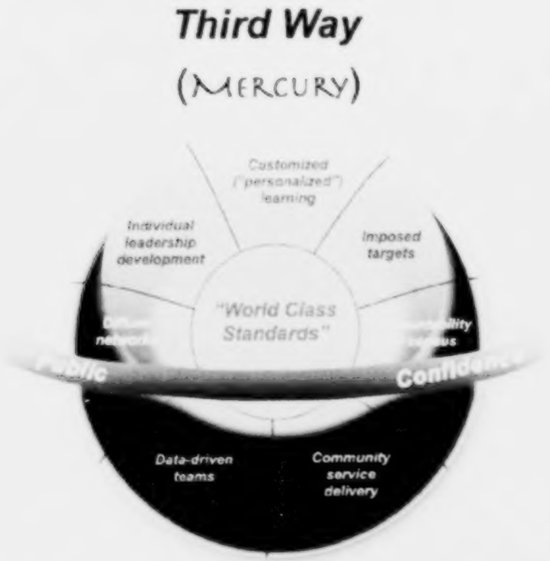
Third Way
(MERCURY)
Customized ("personalized") learning
Individual leadership development
Imposed targets
"World Class Standards"
Public
Confidence
Data-driven teams
Community service delivery

Figure 5.3 The Third Way of Mercury

2.4 The Fourth Way of Earth

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The Fourth Way of Earth goes beyond building public confidence in education through improved results. It builds community with parents and others in relationships of active and engaged trust where they work side-by-side together (Obama, 2005, Hargreaves & Shirley, 2009).

In the Fourth Way as in the Third, teachers and schools work together, but teachers work in thoughtful, evidence-informed communities that value both hard data and soft judgment, applied to deep and compelling questions of professional practice and innovation. They do not just hurry through meetings to produce just-in-time reactions to achievement data. And schools do not only network with distant partners though that is an extremely valuable direction in itself. They also collaborate with immediate neighbors, in pursuit of a higher common good in a community where the strong help the weak.

Leadership in the Fourth Way is not individual but systemic (Hopkins, 2007). Effective leaders help other schools. The system provides resources to replace their time when they and their key leaders assist their peers in this way. This distributes leadership around them and develops younger and hungry successors behind them. In the Fourth Way, leadership is sustainable as well as successful.

The Fourth Way of Earth meets all four of the change imperatives that were outlined earlier – economic, social, ecological and generational. AISI is already showing evidence of beginning to move into the Fourth Way as well as the Third. Learning goals are broad and diverse in nature. Principals are starting to work together within their districts, across schools, forming professional learning communities among themselves as well as leading them for their teachers. Cycle 4 is encouraging interaction and networking across district boundaries. More projects are being encouraged to address parent and community engagement and development. These are all proven steps forward as AISI moves to an even higher level of sophistication.

There are still some strides that AISI can take in holding its place as a world-leader in professionally inclusive change:

- identifying schools and projects at different levels of development or capacity;
- strengthening systemic leadership across schools and even districts;
- devising objective and transparent ways to highlight the need for assistance and support;
- supporting teachers and schools in professionally-driven efforts to develop robust indicators, accountability measures and shared targets that relate to and are appropriate for their own project goals.

Figure 5.4 The Fourth Way of Earth

3. Conclusion

From the First Way of Venus, AISI has rekindled innovation and professional respect, but left behind the inconsistency. From the Second Way of Mars, it largely addresses the urgent and focused emphasis on learning and achievement for all students, but it does not treat all kinds of learning outcomes as equivalent to tested achievement and it has re-energized professionals in ways that the Second Way did not.

AISI has gained much from and contributes a great deal to the Third Way of Mercury in terms of creativity, complexity, innovation, flexibility, diverse pathways, lifelong learning, teamwork, networked interaction and working with diversity. By turning to the Fourth Way of Earth and its concerns with inspiration and sustainability, AISI can be even more effective in bringing people together, in communities where leaders work together across schools and where the strong help the weak, to serve a higher and sustainable purpose that is greater than everyone, and to devise robust, school-driven evaluation instruments as well as set their own improvement and growth targets together that are directly connected to these bold purposes.

21st Century skills require 21st century schools and systems. Mindful teaching and learning; increased innovation and local flexibility; flexible pathways of student learning and professional engagement; evidence-informed improvement that values data and experience in fair measure; shared improvement targets; prudent accountability on measures that match knowledge society objectives; energizing networks that connect schools to each other; and systemic leadership where leaders assist weaker neighbors in the service of a greater common good – these are just some of the strategies that will give us the best 21st Century schools that will develop the most challenging set of 21st century skills. AISI is already a world leader in many of these strategies. Its challenge now is to become a connoisseur of all of them.

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Chapter 6: AISI: A Global Perspective

By Pasi Sahlberg

1. Introduction

Improving education systems and their schools is a global phenomenon. Even the nations where educational performances are celebrated are investing significantly in further development of teachers, schools and districts. For instance, Japan, Korea and Singapore are investing heavily in fixing the flaws that the international comparison studies have indicated in their education systems. In Europe, England, Germany and Finland all are looking for ways to make their schools more attractive to students and responsive to the emerging new expectations of their knowledge societies. Despite these global efforts in improving schools, there is not one dominating design of change but rather a mosaic of approaches.

In this diverse global school improvement movement, AISI is unique in at least three ways. First, it is truly a system-wide effort to help most schools and teachers to improve. It is not limited to selected districts, schools or teachers like most government-run school improvement campaigns. Second, with its four cycles, AISI is an exceptionally long-term intervention that is atypical in educational development where short-term targets of politics determine the lifespan of government commitment, especially funding. Third, AISI makes substantial funding annually available for innovation and improvement in schools. Funding ranging from $70 to 75 million CAD each year corresponds to about 2 percent of the operating education budget of Alberta. It is therefore a significant investment in human resources of Alberta education and unlike any known school improvement initiative anywhere.

The purpose of this chapter is to present an international perspective to assist understanding of the value and effect of AISI and contextualize the analysis and findings of the wider multiple perspectives review. Through a wider perspective, we hope, Alberta Education will be able to continue good practices and new cultures built in and by AISI and weigh some alternatives for the future. The challenge is that there are only a very few large-scale examples of school improvement that, when compared to AISI, would do justice to it. What follows therefore is rather a reflection on AISI using an international education policy perspective. It is based on a literature review, three commissioned studies of different aspects of AISI, discussions in the AISI Colloquium 2008 in Edmonton, and in the AISI Review Retreat in Boston in August 2009.

2. The Modus Operandi of AISI

The purpose of AISI has been to improve student learning. This has been achieved by financing about 1,700 projects based on the needs of districts, schools and the people who work there. This has secured an approach that has also taken into account other local circumstances, such as willingness to learn, capacities of schools and engagement in other development activities. It is therefore fair to say that AISI has been designed and implemented as a meta-project that constitutes several specific projects.

A project-driven approach has its place when the targeted problem is clearly defined and is soluble with available tools and resources. By definition, a project has a beginning and an end. Normally, between these two is a predetermined set of actions that make up implementation of the project. Indeed, project logic emphasizes planning and evaluation that normally require significant amounts of documentation, meetings and administration. Projects certainly have their place in development in general as well as school improvement in particular. But they also have their limitations.

School improvement at the level of the school and classroom only rarely has a clearly definable beginning and almost never an end. School improvement initiatives, pilots to test alternative practical models and research studies are examples of 'projects' that have planned ends and beginnings. AISI has been administered in three-year cycles within which projects have had to be launched and closed. Although districts may now plan and bid for longer periods, and projects can build on or extend previous ones, the three-year cycle of funding and accountability still drives much of AISI's logic as well as widespread perceptions of how to undertake, plan and complete change. This is one of the main limitations of AISI. It rarely happens that any significant intervention in schools that alters teaching and learning can have substantial and measurable impact on student learning in less than a three-year period. This is a particular challenge for those implementing such projects, i.e., schools and teachers.

Another limitation of a project-driven approach is lack of sustainability. When a project is finished, activities financed by that project often slow down or stop altogether. School improvement that focuses on student learning requires sustained support for schools and teachers. The risk related to the project approach in AISI is that some improvement activities may be terminated by the fact that the project ends rather than because the goals have been accomplished. There are some aspects in school improvement that can be fixed by targeted projects (e.g., ICT literacy, developing new curricula, tracking and managing individual student progress, or redesigning science laboratories) but much essential school improvement requires longer-term engagement. For example, cooperative learning that has been one of the popular themes of AISI is such a complex pedagogical approach that it requires more than one project to be properly integrated into teachers' repertoires of teaching (Joyce & Showers, 2002; Sharan, 1999).

Third, a project-driven approach implicitly suggests that the nature of change in schools is linear; that intended outcomes can be achieved by selecting the right actions or inputs. Yet this multiple perspectives review demonstrates that effective (and even ineffective) school improvement processes are characterized by complexity, not linearity; especially in the creation of new knowledge and practices. For example, increased communication and collaboration among teachers, networking with other schools and linking one's own 'projects' to a global community of schools may create situations of new learning where working on the pre-determined plans and goals has less importance than what the emerging opportunities offer.

The modus operandi of AISI through its targeted funding of enhancing selected priority themes makes it more conventional than it might otherwise be. As an initiative this can easily be justified. But is a project-driven approach the most appropriate strategic choice for AISI in the future? What implications does our analysis of AISI as a complex system have for its design and architecture? Would an alternative strategy better guarantee sustainability and reduce 'waste' that administration now produces?

An international perspective does not suggest many changes to what AISI is already doing. But this is not to say that AISI should continue as it stands. Three completed cycles of locally driven school and system improvement have created a foundation that makes other approaches possible. Teachers and schools in Alberta have clearly 'learned' to deal and live with projects. As in any other project environment, some have adapted to project life so well that reporting of accomplishments can reflect more than what was actually achieved. Some international initiatives, one of them being the Aquarium Network in Finland in the 1990s (Sahlberg, 2008), that have been publicly funded, lead to the following ideas for the future of AISI.

- Gradually transform AISI from a project-based initiative into an open network. This would lead to a system that would have various clusters of school improvement operating within one network that is facilitated, coordinated and led by the government. There can be differing operational models, including projects, smaller initiatives and thematic actions, within this network.

- Seek ways to make both entry to and exit from AISI more flexible for schools and districts. Formal procedures in many international school improvement initiatives limit schools' access to and exit from the school improvement activities. This was one of the clear negative aspects of traditional school improvement in Finland that eventually led to more open door policies in educational development in the 1990s. AISI would benefit with its highly professional participants from more flexible ways to let teachers, leaders and schools join the network whenever they feel there is a need for that. Development communities and networks can also suffer from retaining members who are passive or act against ideas of collaborative development and change.

- Reward and recognize collaboration and networking. Teachers too need incentives in order to do great things. Making resources available specifically for collaboration and networking could be one means to promote cross-district collaborative projects and ad hoc teacher networking. If collaboration, sharing ideas and networking are the key principles of AISI's modus operandi, then they should also be built into the accountability system that would recognize good performance on the one hand and hold people accountable for doing that on the other.

3. What is AISI Trying to Achieve?

The AISI framework states that the goal of AISI is to "improve student learning through initiatives that enhance student engagement and performance and reflect the unique needs and circumstances of each school authority" (AISI Handbook for Cycle 4, AISI Education Partners, 2008). AISI views learning broadly as being concerned not only with knowledge but also skills, attitudes and behaviours. If AISI is compared to other government funded development initiatives, it stands taller than many others because of the way it perceives learning as a broader concept. In contexts where a lot of measured data of student achievement are available (e.g., England, Singapore, United States) learning is often narrowed down to achievement on standardized tests. On the other hand, in places where such systematic data are not easily available (e.g., Finland, Sweden, Estonia), learning is normally seen within a more generic concept that also refers to non-academic achievement, such as social skills, self-esteem and behaviour.

The question of whether an intervention and investment like AISI is making any difference to the quality of education in Alberta has both political and scientific interest. During the first three cycles of AISI, it is understandable that this question is partly answered by looking at possible gains of student achievement on PATs. But this may not be enough – or relevant – in the future if the initial question – does AISI contribute to student learning – is to be comprehensively answered. That is why this report also suggests widening the scope of data collection and diversifying the research function within and of AISI. Some international efforts similar to AISI suggest that non-academic outcomes, such as improved student engagement, teacher involvement in school development or improved school climate, can have an equally significant impact on the quality of work and learning in school compared to direct interventions. The issue that is well known among those in charge of AISI is that some, if not all of the important learning outcomes are only observable (and measurable) after a delay that bypasses the length of AISI cycles.

In Canada, as in all other developed countries, the focus of education policies will gradually shift to emphasizing the knowledge, skills and competences that are necessary to live a happy life and succeed in the world of work (OECD, 2008). A common term used in this context is '21st century skills'. These skills, among them problem-solving, team work and risk-taking, are only marginally covered in current curricula and measurements that indicate how students succeed in school. In the forthcoming cycles of AISI, the role of these 21st century skills for competitiveness, sustainability and personal development will likely be strengthened. The challenge is that teaching these skills is much more difficult and demanding to teachers than teaching conventional academic knowledge.

The other dimension of this challenge is that learning these new attitudes and skills is dependent on the cultures of the schools, in other words, how schools as organizations operate based on these attitudes and skills. It is, for example, difficult to imagine that students would learn to take smart risks in their own learning if their school reflected an opposite way of operating for their teachers. In general, teachers will be able to create and maintain conditions for learning 21st century skills in their classrooms only if they can practice and experience these same skills in use in their staffrooms. This two-tier phenomenon of change in schools will be a particular challenge for the future of AISI.

AISI has been planted and then grown in a particular educational and cultural soil. Highly professional teaching staff, dedicated leaders and a prosperous economic context have provided a close-to-ideal situation for this particular kind of school improvement initiative to become a success. This would not be possible without at least some degree of mutual trust within schools between principals and teachers, in communities between schools and parents, and in the province between districts and the provincial government. But the political realities have also created an exceptionally tight accountability system that holds schools and teachers accountable for their work through tests and examinations mandated by the government. For any external observer this would invite a question: How can trust-based school improvement, which respects local needs and actions for change, be put in the same equation with test-based accountability that indicates an undermining of teachers' and schools' judgements of how well their students are performing? In this sense, AISI is trying to build mutual trust in the education system at the same time as the system is maintaining distrust by suggesting an even tighter grip on schools through accountability.

Building trust in public education is an important purpose of AISI. Looser control over each project, a softer approach to determining success or failure of projects and better communication of what schools are doing to their communities would be possible means to give more space for trust to flourish. The Aquarium Network of Finland aimed to do just that. Finnish schools and teachers were learning to be in a new environment that required mutual trust, openness and transparency to operate as planned. The Aquarium Network was one of the main avenues – together with the school-based curriculum reform of 1994 – to show how to give schools their freedom as well as responsibility. Thus, AISI has a great opportunity to become an even more powerful engine of trust-building in the Albertan education system.

How can AISI orientate itself to the question of education for the future? When describing school improvement in Alberta as an investment McEwen (2006) writes that

> if school improvement is about improving student learning, then we must focus on the future. What students learn today must prepare them for a future more than a decade hence when they will take their place as productive members of society both economically and socially. (p. 15)

In other words, AISI has by definition a futuristic orientation. It is strong in trying to help teachers to teach their students in ways that help them in turn to cope with an unpredictable world ahead. But AISI is focusing much less on 'learning from a future' that would help students to comprehend the complexity of the unknown. Future-making aspects of the AISI Cycle 4 are "A new focus on the complexity of innovation and change processes" and "increased emphasis on the use of digital technologies and innovative approaches for communicating, sharing, networking, and disseminating knowledge". An opportunity that AISI now has to take is a good step forward that strengthens the focus of AISI as a facilitator of future-making as part of the new vision for Alberta.

4. The Weakest Link: Involving Others

When AISI handbooks describe the AISI framework and its key characteristics, 'partnership' ranks very high with being 'student focused'. Just to illustrate the level of detail in defining what partnership means, the Cycle 4 Handbook (AISI Education Partners, 2008) states that AISI is

> a partnership among teachers, superintendents, trustees, business officials, universities, parents, and government. The AISI partnership is characterized by trust, collaboration, and teamwork among the education partners who share a commitment to improving education for Alberta students, who are the beneficiaries of this strong and diverse partnership. By working together, the partners continue to develop new relationships, strategies, and practices that provide long-term benefits to teaching and learning in our province. (p. 5)

High priority given to 'partnership' as a principle of the AISI framework indicates that it is also an expected element of accepted projects. This is a common feature with many other large-scale school improvement initiatives, for example in the Accelerated Schools Project in the United States and Hong Kong, The Innovative Design for Enhancing Student Achievement in Schools (IDEAS) in Australia, and the Aquarium Network in Finland. In many international large-scale school improvement initiatives, partnership refers to parental involvement, community engagement or school-university partnerships. This is how it seems to be in AISI as well.

Case studies included in this volume indicate that there is room for further collaboration even within AISI itself. First, the steering of AISI would most likely benefit from larger representation than it has currently. According to the AISI Handbooks, the AISI Education Partners Steering Committee that has guided the development of different cycles, themes and strategies constitutes the following AISI Education Partners: Alberta Education, Alberta School Boards Association (ASBA), Alberta School Councils' Association (ASCA), Alberta Teachers' Association (ATA), Association of School Business Officials of Alberta (ASBOA), College of Alberta School Superintendents (CASS), and University Faculties of Education. These are all relevant and important partners. A critical question would be: Where is the voice of parents or the third sector (civil society) in AISI management? For example, the experience from the Aquarium Network in Finland indicates that the role of youth and sports organizations in steering and implementing the network strategy were vital. It was not only that it was 'politically correct' to involve partners outside of the education sector who work with the same young people as schools, but these external-to-education partners brought fresh ideas and new questions to the work of educators.

The AISI partnership has resulted in the building of trust, collaboration, and teamwork among the education partners. Indeed, trust building is one of the conditions for success in AISI. It is also necessary that AISI pays attention to expanding current partnerships at the district level by engaging more individuals, associations and business organizations in AISI activities. This is important, as international experiences suggest, because the drivers of renewal of education often are outside of school. Changes in the economy and thereby in labour markets, local social issues and ongoing globalization all have a strong influence in how the role of education shifts over time in our societies. Government is responsible for adjusting education policies to the needs of the society but it rarely is the driver of educational change.

There is no evidence that business leaders have played any significant role, in general, at the local level. The perception that business leaders are not systematically engaged in the dialogue of school improvement in districts gets support from my own experiences when visiting several jurisdictions and communities in Alberta in spring 2009. Meetings I attended were not related to AISI but more general gatherings for people to talk about their schools. With a couple of exceptions those who represent local businesses or employers were missing.

Further networking would probably be good for AISI in the future. There are two aspects that could receive attention. First, the central management of AISI could expand the representation of education partners by involving individuals from youth, sports or other third sector groups that have a similar mission to AISI to help young Albertans to learn better. This would then, hopefully, lead to wider stakeholder engagement at the district level. The Finnish experience in a similar situation showed that it would have been a serious mistake to leave out those associations and individuals who work with the same youth with similar goals. Second, there could be more networking between the districts within AISI. One purpose of this lateral networking would be to share experiences in how to establish constructive dialogue and partnership with the communities. It would, as international experience suggests, also by itself enhance professional development and strengthen the professional learning communities in these districts by collaboration among teachers and principals from different districts.

5. Energy Efficiency and Sources of Renewal

AISI is a complex system as others have described in this volume. Complex systems are open in the sense that they "continuously exchange matter and energy with their surroundings (and so judgments about their edges may require certain arbitrary impositions and necessary ignorance)" (Sumara & Davis, in this volume). From that systemic perspective, change in AISI can refer to 'improvement' that operates as a process of renewal. A typical form of renewal in complex systems is self-organization that spontaneously arises as the actions of autonomous agents that will be connected and co-dependent. In an international perspective this is a unique approach to analyze a large-scale government-funded school improvement initiative.

A key question for the future of AISI is to what extent it will be seen as a process of renewing education in Alberta, or as retaining its focus on improving student learning in schools. Renewal here refers to continuous systemic change of the education system driven by the changing environment and improved internal conditions, including resources (energy) (Hargreaves & Fink, 2006). Renewal is not possible based merely on rational agendas – what is required is a provincial drive and a common, inspiring goal. Alberta has been successful, so far, in building a prosperous, well-functioning society with a world-class education system. However, the key success factor in the future will not be national or provincial capacity to fix the system and improve its parts but system-wide renewal capability. In several analyses (see Sahlberg, in press) of the progress of Finland as a knowledge economy, such renewal has been identified as one of the key issues in the national strategies of Finland during the past few years.

AISI has great potential as a system-wide change effort to act as a source of energy for renewal. If this becomes a more focused intention of AISI, it is important that it will bring people – teachers, principals, students, parents and community members – even more to the forefront of action. An aspect that is important in further 'humanizing' such change initiatives as AISI is to minimize 'waste' that from the point of view of schools – reducing unnecessary administration, shortening wait time and optimizing paper work. It also requires finding a good balance between a rational education policy agenda and an emotional as well as symbolic drive that people find inspiring and stimulating enough to take action. It is perhaps interesting for Albertans to read what Professor Stahle (2007) wrote about the need of renewal for the future of Finland:

> Renewal is always based on people, their knowledge, learning ability and motivation. Technology as well as societal structures have an integral role in the renewal process though they are seldom the key drivers. In renewal we generally deal with various dimensions – emotional, cognitive, organisational, and political – but the order of appearance and importance goes from the emotional to the cognitive. (p. 1)

Emotional energy most often flourishes in communities where people are together. Dialogue in communities can become an act of enriching interaction where people help each other to be their best and rise further than anyone could go alone. It is to understand that helping others to succeed is the best strategy to be successful yourself. In order to create enriching cultures in districts and in their schools, there needs to be trust and mutual responsibility in the community of educators and students. Trust is the foundation on which a community builds its being and behavior. When there is no trust, people fall through that foundation to the stage of fear and use their energy on coping with insecurity and survival. An enriching community, therefore, emerges in trust, security, and togetherness – all core values of education in Alberta and beyond. An enriching community and interaction that drives it are conditions for risk taking, ingenuity, and creativity. It requires that each member in the community is valued, i.e., that each experiences concretely that he or she is important and needed in the community that enhances the feeling of belonging. A culture of competition is often harmful in efforts to build enriching community. Therefore, school improvement should enable teachers and students to learn and create conditions for enriching interaction. Figure 6.1 presents ways to build enriching communities that enable system renewal.

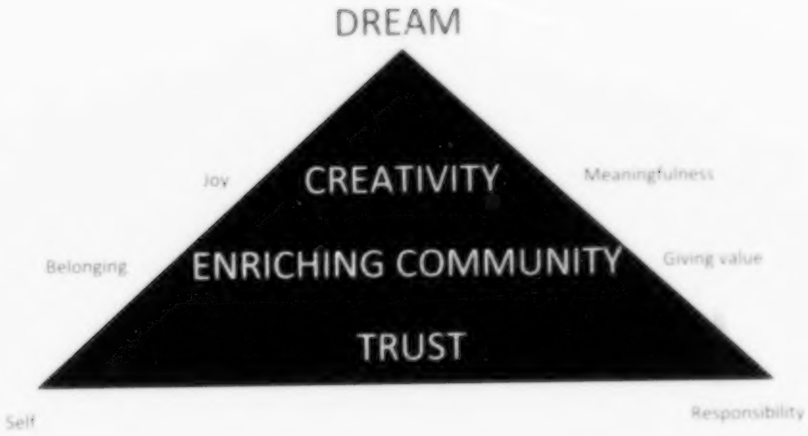

Figure 6.1 Building of Enriching Communities

Creativity in school is only possible if people – both students and teachers – are encouraged to take risks. This requires safe and secure communities where mistakes and effort are rewarded as much as achievement. It should be noted here that Minister Dave Hancock in his speech to the AISI community in early 2009 encouraged teachers and schools to take risks and not be afraid of failing or being wrong. This is a very powerful message for a more creative and experimental AISI. Trying new ideas in practice often brings joy and increases meaningfulness in school when people can fulfill their personal wishes and create new ideas and experiences for themselves and others.

A creative culture of learning is the ultimate goal of school improvement. That is more than 'improved student learning'. It is driven by a personal goal, vision, or dream. It is stimulated by positive emotional energy that, in turn, is a source of renewal and sustainable development. A dream is a counterforce of fear (or nightmare). That is why in school improvement we need not only rational goals and measurable targets, but also a compelling vision and inspiring dreams.

I have written elsewhere that policies that support school improvement should focus on developing three elements: creative and competent people, productive structures (i.e., schools and learning environments), and creative cultures of learning (Sahlberg, 2008). AISI Education Partners can be confident that schools have enough creative and competent people. In other words, based on this review of AISI, there is reason to claim that a critical mass of *'enrichers'* exists in school. *Enrichers* are those who know how to create enriching interaction and who can work with leaders to build enriching communities in districts and schools.

Second, AISI already supports and has created structures that enable people to communicate, meet, and exchange ideas much more than in any comparable large-scale school improvement initiative. But there is always room for improvement. Further networking, cross-district collaboration and involvement of the wider community in dialogue are good ways to do that. Productive structures and light-touch administration are necessary elements of successful school improvement. It is important that teachers, students, school leaders and others involved in AISI have opportunities for informal interaction and communication outside of formal professional contexts.

Third, as mentioned earlier, AISI has promoted building trust in schools and thereby reduced feelings of insecurity and fear in the school. Fear, frustration, and hopelessness lead to development of different coping strategies that suck energy from individuals. For example, it is a common phenomenon in schools that individuals play several coping games in order to survive in insecure situations. Not making a fool of oneself in front of others is a typical coping strategy. It takes a lot of energy to keep that strategy up, especially in problem-solving or creative situations that school improvement typically is about.

Four common aspects that are important for renewal and that characterize successful implementation of AISI are the following:

1. The school has a vision or preferably a dream.
2. There is creativity in the school.
3. The school is an enriching community.
4. The school has a culture of trust.

AISI can lead the way to build ideal cultures of learning in schools by focusing on enhancing the use of emotional energy and building enriching communities in schools. Figure 6.2 describes the tension between intentional states of emotional energy and enriching community on one side, and an emotional vacuum and impoverishing community on the other side.

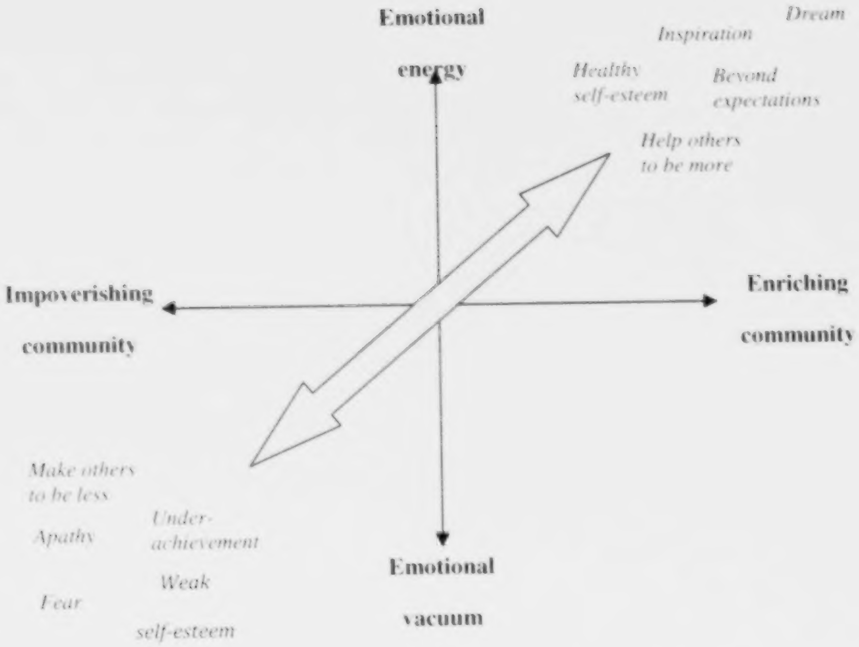

Figure 6.2 Community-Energy Tensions in School Improvement

What is the essence of enriching interaction in school improvement? The answer is that one can adopt the tone of the other. As Himanen (2007) has claimed, a test of this is to see if you can sense what the other person has always longed for. School improvement policies – if the community-energy tension in Figure 6.2 is taken seriously – should provide more room for genuine dialogue and collaboration in schools as expressed by many experts (Hargreaves & Fink, 2006; Joyce & Showers, 2002). Inability to do so may have very negative long-term effects. Apathy, low self-esteem, and fear are some of the features of a culture where dialogue and collaboration have vanished and are replaced by monologue and isolation. This is not a rare occurrence in schools that are driven by internal competition, artificial races for excellence and a search for higher standards that may not be what young people need in their lives. It is therefore important that the future of AISI gives proper focus to building enriching communities in schools and driving change through emotional energy released by sustainable leadership.

6. Conclusion

AISI is a shining star in the sky of global large-scale school improvement. It clearly has a lot to offer to others who are working on similar goals. It is difficult to find anywhere a comparable change effort that would be of the scale, size and overall magnitude of AISI. International literature on school improvement consists of many similar projects but they are without exception focused research projects, restricted pilot or experimental initiatives, or short-term government interventions (Chi-kin Lee & Williams, 2006; Hargreaves & Shirley, 2009; Harris & Chrispeels, 2006; Sahlberg, 2010). That is why it is difficult to compare AISI and its achievement to any other government-run initiative.

Finland is an interesting comparison to Alberta. They have same size of population, are both modern knowledge-based societies and in many ways have similar social values. Moreover, 15-year old students in Alberta and Finland do equally well in the OECD PISA surveys. But Finland has attracted much more international attention in global media as a good example of an education nation. Alberta has a lot to offer to others as well. Based on this review it is easy to suggest that Alberta Education would use AISI bravely as a modern, evidence-based example of a system-wide school improvement practice that has also a proven record of making a difference in schools and their communities. Finland, in turn, has only a little to tell others about how school improvement is arranged at the level of the education system. On the global scene, the strength of AISI as a change design is that it is system-wide, builds on schools' own initiatives and has an extraordinary system of collecting and using data for monitoring and research.

Alberta also has a great capacity of human and financial resources to conduct something of the magnitude of AISI. Political stability and sustainability, a strong Teachers Association as an active partner and well-trained teachers provide a unique context for a longer-term change strategy. What distinguishes AISI from the Aquarium Network initiative in Finland in the 1990s is the strong commitment – both ideological and financial – by the Alberta government that Finland did not have. The challenge that remains in Alberta is the further development of networked leadership of change that is an issue of school and district leadership and leadership development more than that of central administration.

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Chapter 7: Findings

By Andy Hargreaves, Robert Crocker,
Brent Davis, Lori McEwen, Pasi Sahlberg,
Dennis Shirley & Dennis Sumara

1. Introduction

This chapter brings together the results of the three evidence-based components and the two historical and comparative reviews that comprise this multiple perspectives review. In the project timeframe of six months, this review has undertaken

- a system-wide statistical meta-analysis of AISI's impact and of the challenges of measuring AISI's impact on Diploma Examinations and provincial achievement tests of student performance, and a range of other quantitative measures of survey results such as satisfaction levels;

- a study of three contrasting school districts and their different approaches to interpreting and implementing AISI;

- a collection of 12 condensed case studies of AISI projects across the entire province;

- a review of and response to these data-driven analyses from the perspective of international comparisons with similar initiatives in other high performing countries, especially Finland;

- a location of AISI, its architecture, impact and future possibilities, in relation to four historically sequenced approaches to or "Ways" of system-wide educational reform.

The results of these components have not just been combined in an additive way, but they have been synthesized and integrated through cross-team dialogue in telephone conference calls, email interaction, critical responses to all draft chapters by all team members, and a three-day project retreat to review these drafts and responses and both develop and discuss overall findings and recommendations, in August 2009. Responses and reactions to early drafts for AISI accuracy were also provided by those responsible for AISI within the School Improvement Branch of Alberta Education. In some ways, we hope, the conduct of this multiple perspectives review has been representative of the rigorously interactive and collectively committed processes and practices of AISI itself at its best. Chapters of findings and recommendations are the result of this process.

2. Findings

This section summarizes the findings of the review. It is organized by the overarching questions.

In general, the research team found that AISI constitutes a world-class and world-leading example of a system-wide educational strategy. This strategy, designed by Alberta Education and its partners, inspires teachers and administrators. It enhances their professional growth and enthusiasm. AISI seeds new, research-informed practices within local communities then spreads them across districts and schools; and it diffuses existing knowledge as well as creating new knowledge.

AISI embodies a change process that addresses the complexity and adaptability necessary in a fast-moving, knowledge-driven world. It avoids the excesses of unregulated chaos and permissiveness of uncoordinated innovation on the one hand, and of hierarchical and inflexibly linear systems of top-down or layered implementation on the other. It achieves all this new and ground-breaking work with no discernible negative impact on the exemplary record of student performance as measured by provincial achievement tests for which Alberta has become world-renowned.

AISI has never been a static initiative. It unfolded in a continuous culture of inquiry, openness, reflection and adaptation that is rare among government-sponsored innovations. The School Improvement Branch of Alberta Education does not merely endure critical feedback but actively solicits and then rapidly responds to it. All projects have onerous accountability requirements and have been subject to rigorous evaluation, leading to clear consequences of adaptation, change, and shifts of focus or direction. This review forms part of the transparent learning culture that is evident in many of the projects as well as in AISI's overall leadership. This continuous and deliberate process of inquiry and review has led to shifts in the culture and orientation of AISI over time. In the past decade, AISI has transformed and continues to transform

1. *from* a project-driven and initiative-driven approach *to* a more embedded and continuous change process and strategy;

2. *from* a predictable, time-bound planning process of uniform funding cycles, *to* a more flexible process of planning and development;

3. *from* a collection of disconnected or loosely connected projects *to* a province-wide network of improvement and innovation;

4. *from* a change process that has swung between bottom-up and top-down orientations in the first two cycles, *to* a change process that balances and integrates these dynamics and also adds a strong, lateral peer-driven change dynamic in the third and fourth cycles;

5. *from* a strategy to spread and embed existing knowledge in order to enhance improvement and implementation, *to* a strategy that also creates new knowledge in support of increased innovation.

Our review also identified some of the limitations of AISI so far as well as challenges that it faces in the future. For example, elementary schools have embraced AISI more deeply than high schools, where teachers' understandings of their roles as experts in the area of academic content knowledge have made it difficult for them to focus on the province's learners and their current and future needs. AISI also needs to work more deliberately on leadership development, and especially on modifying the roles of principals and other staff to support the development of teachers. AISI projects can also benefit from more robust knowledge dissemination and exchange across district lines. Finally, there is scope for more explicit attention to the development of stronger relationships with parents and other community members. These and other findings are organized in relationship to five overarching questions, plus an additional one, that guided this study and are elaborated in the recommendations.

1. What is the distinctive theory-in-action (change architecture) of AISI?
2. What is the value of AISI? (What are the values of AISI?)
3. Has AISI changed the culture of education in Alberta? If so, how has it?
4. Is it possible for jurisdictions to do these projects and activities without AISI?
5. Would the values of AISI continue without funding?
6. What are the future challenges and action points for AISI?

2.1 What is the distinctive theory-in-action (change architecture) of AISI?

AISI promotes and funds locally-developed, district-led innovations and improvements. It networks educators and parent and community members together through schools, conferences, and a web-based AISI Clearinghouse. To do so, AISI has a four-dimensional architecture:

1. *vertical* – top-down and bottom-up;

2. *lateral* – project-to-project, school-to-school;

3. *radial* – outside-in and inside-out research expertise and practitioner inquiry;

4. *temporal* – connecting medium-term and longer-term perspectives.

AISI is a complex mixture of top-down, bottom-up and laterally-driven change. It is guided by the AISI Education Partners Steering Committee and managed (but not micromanaged) by the School Improvement Branch (SIB) of Alberta Education. SIB works collaboratively with the AISI partners to set priorities and strategic directions for each cycle. SIB manages three-year project cycles; it further manages the application and approval process, coordinates conferences and updates a website Clearinghouse to create connectivity across projects. SIB operates in a consistently transparent, inclusive and responsive way, with a quiet passion for locally-grounded and professionally driven change that serves the public good of all students. It sees its role as facilitating, steering and gently but firmly monitoring and revising this process over time.

From the bottom-up, AISI's theory-in-action empowers educators to develop professional and intellectual projects based on their own locally-created needs assessments and subsequent initiatives for self-initiated change. Many of these projects come from the individual passions or recent professional development experiences of teachers and administrators who connect their initiatives to the priorities in the current AISI Cycle. Others – up to 40% per cycle – are selected by districts in relation to province-wide themes such as differentiated instruction, professional learning communities (PLCs) or assessment for learning that are AISI priorities and also related to a more general policy thrust in Alberta Education as well as to the availability of external trainers who seem able to deliver implementation. Although all projects feel local in location, many are nonetheless provincially central in origin. Irrespective of the source, what matters in any project is the degree of ownership teachers and school administrators feel towards it.

A stance of *active trust* (Giddens, 1994, p. 186) from the School Improvement Branch responsible for AISI towards teachers and school leaders has produced hundreds of locally-generated initiatives that have catalyzed educators to explore new routes to teaching and learning that often are precluded by more orthodox school reform strategies. AISI creates significant opportunities for increased teacher leadership either for teachers to be promoted to roles of coordinators in their local district office, or for them to be allocated time in the school day to plan and interact with colleagues within and across local schools, without having to abandon their passions and contributions as classroom teachers. AISI promotes many educators' professionalism not by taking them out of the classroom but by helping them to understand better what is transpiring within the school.

The change architecture for administrators and teachers plays out differently in AISI projects and also varies over time. At the beginning of Cycle 3, and earlier in some places, the emphasis moved from individualistic and uncoordinated projects at the discretion of schools or groups of teachers to an "umbrella approach" in many districts. As a consequence, the change processes and projects became more focused and also more centrally driven and coordinated. Sometimes this led to an emphasis on implementing a particular strategy with the support of trainers and of administration by a district-based coordinator. In the worst case scenarios, these implementation-oriented strategies could come across as contrived or forced with infrequent interactions other than training events leaving schools and projects with little knowledge of what their peers were doing. On other occasions, building consensus and utilizing broad-based steering committees guided the work and the decisions around change projects in a way that spread responsibility and garnered support from participating educators.

The freedom and creativity AISI extends to its projects is accompanied by a strong accountability component that requires all projects to complete annual reports as well as more detailed analyses at the end of each three-year cycle, related to indicators and measures of impact. Many of these measures and instruments are selected from those that are already easily available such as provincial achievement tests and province-wide satisfaction surveys.

Laterally, AISI projects and project schools are usually connected within their district. The degree of connection varies from occasional common workshops and training days with external providers, to complex and continuous interaction. Some districts hold celebrations at which teachers or teams of teachers share poster presentations of their work, inviting comments and critique from their peers. A few districts have also created district-wide professional learning communities for their schools. Annual provincial AISI conferences as well as a number of regional conferences that connect smaller rural districts create further opportunities for schools to share and celebrate practices and learn from each other's experiences. The AISI Clearinghouse provides transparency about the nature of the work that is going on in AISI sites throughout Alberta. Because educators have easy access to those sites, they can contact colleagues throughout the province who are working on similar issues and share similar challenges.

AISI expresses two aspects of innovation – creative combination and disruption. Creative combination involves bringing together different existing resources to solve new problems – refining methods of instruction, combining existing approaches to cooperative learning, adapting and integrating new materials etc. Abrahamson (2004) argues that this is a neglected but effective way to undertake innovation in the corporate world. Second, innovation can be disruptive (Christensen, 1999; Christensen et al., 2008) – a potential that AISI poses when its collaborative, networked processes of teacher-driven innovation pose problems and tensions for traditionally top-down systems.

The creative, bottom-up and lateral processes combined with central guidance and support that are embedded in AISI's change architecture explain much of the universal enthusiasm towards AISI that is expressed by project participants.

Conceived three-dimensionally, AISI is not only bottom-up, top-down and lateral in nature; it also combines inside-out and outside-in change processes that penetrate into its core and back out again. Several districts had collaborated with university faculty at various points in their project funding cycles and received assistance in designing surveys, studying student achievement data, and modifying assessment practices. AISI has made explicit the connection between academic research and professional practice. External stimulation and assistance are balanced and integrated with internal study and reflection.

Like all change strategies, AISI also has a fourth dimension: time. AISI's three-year cycles establish longer timelines for change, action and results than is common in most other system-wide reform efforts. In less stable political environments, these are usually driven by the demand for measurable short-term achievement results. In these other cases, this culture of *presentism* (Lortie, 1975) can deplete energy and distract attention from securing the longer-term transformations in teaching and learning that are more appropriate for competitive knowledge economies. AISI largely avoids these distractions through an approach that is iterative, transparent, and participatory. Project participants consistently praised AISI staff for their accessibility and respect for the on-the-ground realities of teachers and school staff.

AISI has a unique architecture of educational change. In terms of scale, it encompasses more than 95% of the province's schools and around 2% of the provincial education operating budget. It has now been in operation for a decade and is into its fourth cycle. The spread and duration are greater than for any other school-based or network-driven initiatives that are usually smaller, more local, temporary or self-selected and voluntary in nature. Yet compared to national or province-wide reforms of similar scale, AISI is not about implementing or delivering centrally-determined mandates, on short timescales, in a small number of core and basic learning areas, that are usually linked to tested achievement results. It is complex, flexible, professionally inclusive and locally adaptable.

AISI values research-based practices, but does not exaggerate their universal applicability to all schools and students, it does not automatically exalt them above teacher judgment and knowledge, and, in recognizing the value of scientifically-based improvements, it does not exclude the value and necessity of new knowledge or innovation created then diffused by teachers locally as well.

Most other systemic reform models are at best two-dimensional. They have top-down pressure, bottom-up support and perhaps some lateral interaction to help implement central mandates. AISI is four-dimensional. The bottom-up and lateral improvement processes are more vigorous, but more importantly, there is a more deliberate and robust interactive engagement between outsider and insider knowledge, and more openness to mid-term and longer-term improvement goals and processes than other reform models can normally accommodate. AISI is a national, international and provincial treasure of improvement and innovation. It is worthy of preservation and recognition. Its architecture also needs further renewal.

While AISI is indeed a complex system, local districts vary in the degrees of complexity they exhibit and have the capacity to manage. Central steering and guidance was often welcome, but AISI funds were absorbed by some districts into mechanisms for implementing pre-packaged priorities such as professional learning communities that seemed to spread in brief but intense outbreaks across the province. Local innovation or improvement could turn into contrived collegiality (Hargreaves, 1994). AISI funds were sometimes used to replace existing core funding for professional development instead of enriching and extending professional development for teachers.

AISI connectivity within districts is often strong, but as yet it is much weaker in connecting schools and projects across districts, working with universities and university research communities, and connecting with partners other than educators. AISI's networks and partnerships are largely ones of professionals working with professionals, not professionals also working openly and enthusiastically with other partners like parents and businesses. The directions established by Cycle 4 for increased networking and collaborating with other partners are in this sense both timely and welcome, though more could be done by connecting with other large-scale networks internationally that have records of proven success.

AISI's combination of outsider and insider knowledge on a province-wide scale is impressive. The gap between these different kinds of knowledge is, however, currently too great. On the one hand, external knowledge of "scientific" methods of instruction provided in packaged workshops by outside trainers is often persuasive and even inspirational (though not always so, as when some of the research team heard that in classrooms, some trainers could not persuasively practice what they preached in their workshops). However, in this format, what is usually presented is interpreted in the context of advocacy of a particular approach and market associated with the trainers. So it is vital to develop strong school and district cultures that can interact critically and selectively as a community with advocacy-based presentations of external knowledge. On the other hand, educators in schools did not seem to be "accountability-literate" and were often inclined to select external quantitative measures like PATs that were not related to their project goals, and to rely on descriptive and narrative portrayals of a qualitative nature when providing evidence of their own. There is a great deal of need and a lot of room for projects and schools to be able to develop their own appropriate evidence and indicators of progress of a quantitative kind that are as persuasive, and indeed more persuasive and appropriate than externally available measures. Universities have been able to support the development of that capacity for some projects, and perhaps the current focus on assessment for learning may increase accountability literacy even further, but the room for growth and support remains considerable.

Last, on the fourth dimension, the timescales of change within AISI are a refreshing change from the short timescales of imposed, test-based, system-driven reforms in many other countries and provinces. Imposed, short-term targets in these cases certainly do deflect attention from longer-term goals of a more challenging, transformational nature. But equally, mid-term and longer-term goals in AISI projects are less likely to be achieved unless there are clear indicators of more immediate or proximal progress towards those goals. This is another case for developing the capacity of schools and districts to develop and deploy their own indicators of shorter-term progress towards their ultimate goals, and also of the need for persistence with projects and initiatives beyond funding cycles if there is evidence that movement towards those goals is demonstrable.

2.2 What is the value of AISI? (What are the values of AISI?)

No large-scale educational project has value unless it gets results. What matters is what kinds of results are valued and what methods are available or can be devised to demonstrate them (or their absence). The results and how confidently we can make statements about them are the value of AISI, and what things count as results (and the ethical means of achieving them) are the values of AISI.

At its core, AISI seeks to "improve student learning and enhance student engagement and performance" (AISI, 2008). Its unique architecture is the organizational and ethical methods it selects and designs to try and secure these results.

Positive changes over time were found for all measures in all three AISI cycles. AISI's impact on provincial achievement tests (PATs) was small but larger for local achievement measures and survey measures. Discernible effect sizes on PATs are rather modest, and many seem attributable to being statistical artifacts of, for example, regression towards the mean or outlier effects.

AISI's impact on provincial achievement tests (PATs) is the first and most obvious measure that many might choose to determine the initiative's effectiveness. Here, the evidence is not compelling on any dimension or in any direction. There are few consistently positive or negative correlations between AISI themes or treatments and PATs. Some upward trends could be detected in mathematics achievement at a time when provincial scores were falling, but even these were not sustained.

PAT results can be interpreted in a number of ways. Perhaps AISI has had no significantly consistent effect anywhere on anything connected to student learning. Having used several analytical methods to examine correlations with PAT scores of project themes and treatments, across projects and over time, the widespread demonstrable absence of anything in terms of effects, one way or the other, seems the least likely explanation.

A second explanation is methodological. PAT data are not easily connected to traces of particular students who have experienced specific AISI initiatives. Apparently similar AISI projects on the same themes might be and clearly are sometimes implemented quite differently – so effects may not be at all consistent. Projects vary over time as they mature. Many AISI project themes are also not meant to have a direct impact on PATs. They are designed to change the nature of learning, rather than raise scores in existing kinds of learning. There is a strong need to create and identify instruments and indicators of AISI impact that have a clear and coherent relationship to AISI project goals.

A third explanation is systemic. AISI has become increasingly integrated into the educational system and improvement processes of the province as a whole. It is a complex reform, not a simple treatment or intervention, and part of its success is its increasing influence on the educational culture in general. Highlighting its independent impact is far from easy. One promising step forward might be to design some AISI projects as experimentally controlled interventions – an idea supported by one member of the review team. Given AISI's culture of integrating and spreading ideas throughout the profession, on a continuous and cumulative basis, a second possibility is to devise more precise impact measures project-by-project, then cumulate these effects across projects.

AISI shows stronger correlations and effect sizes with survey measures of satisfaction. Increases in student satisfaction and changes in attitudes might be seen as indicators of improved levels of student engagement in learning – something that usually precedes improvements in achievement. However, attitudes and satisfaction are only rough indicators of engagement and it would be helpful for more projects to use one of the many student engagement instruments that are already available instead.

The strongest AISI impacts were on measures of teacher growth. It is possible that these represent a halo or Hawthorne effect although that in itself is an indicator of teachers' appreciation of the trust, resources and recognition that are accorded to them in the AISI architecture. Our review's qualitative findings suggest something deeper is also at work in terms of AISI's impact on teachers' sense of professionalism and on the development of teacher leadership opportunities and experiences. These factors represent AISI's values as much as its actual value.

Informants all agreed that AISI is catalyzing authentic and deep conversations about teaching and learning that are contributing to a richer repertoire of instructional practices and improved student learning in Alberta. They credited AISI with giving them new ways to observe student learning, identify obstacles to achievement, and revise instruction so that their students learn at high levels. By exposing educators to alternative sets of practices, by embedding ongoing support into schools through AISI-funded lead teachers and consultants, by connecting teachers and projects to each other in relationships of mutual learning and support, AISI has helped to re-ignite teachers' curiosity about new and better ways of teaching their students.

Not all collaboration, innovation and networking are effective and one or two examples that came to our attention, especially in some districts' interpretations and implementations of province-wide thrusts and associated training programs could be superficial, faddish or forced. There is certainly a need to push harder, deeper, more consistently and more urgently in ensuring that cultures of professional collaboration move beyond sharing, celebration, contrived implementation and quick exchange into interactions among colleagues that are characterized by greater critical challenge and inquiry. But in general, research evidence points to strong associations between professional collaboration and improved student learning (Rosenholtz, 1989, McLaughlin, & Talbert, 2001), and the qualitative testimonies of AISI participants, as well as the quantitative correlations with professional growth reinforce that.

2.3 Has AISI changed the culture of education in Alberta? If so, how has it?

AISI's change architecture has led to clear shifts in the culture of teaching and improvement in Alberta. We found many instances of AISI influencing school and district policies in ways that represented a marked shift in understandings about teaching and learning at the school and classroom level. This was evidenced in the creation of common report cards, the alignment of curricular content with local assessments, and the development of principals as instructional leaders of learning, for example.

Instead of seeing assessments as unwanted external impositions of provincial achievement tests, the emphasis on assessment for learning has helped teachers grasp the value of diagnostic and formative assessments that can support their classroom practice. There is room for further growth in terms of teachers and schools developing and deploying more of their own designed or chosen quantitative instruments and indicators so they can monitor impact of and progress in their self-designed initiatives; but the emphasis on assessment for learning in AISI's third cycle has undoubtedly started to lay a foundation of a learning-driven culture of greater assessment literacy.

One clear and demonstrable impact of AISI on the wider educational culture of Alberta is in terms of consolidating and extending a strong and enthusiastic culture of professionalism and professional collaboration among schools and their teachers. Without exception, all of the educators and parents we interviewed were enthusiastic about AISI, and the way that it energized the profession. This AISI-driven culture has challenged the three Ps that traditionally perpetuate classroom conservatism in the culture of teaching:

- *presentism* – concentration on short-term changes that make visible and immediate differences with one's own students, or that respond to external accountability demands for short-term gains in tested achievement results (Lortie, 1975; Hargreaves, & Shirley, 2009a);

- *privatism* – enforced or preferred isolation from other teachers, and reliance on individual judgment and improvisation compared to sharing and developing expertise with colleagues (Little, 1990; Rosenholtz, 1989)

- *parochialism* – believing that practical experience and personal judgment are always superior to external theory or the evidence of research (Hargreaves, 1984).

At the same time, AISI projects and the culture deriving from them have largely (though not completely) avoided the excesses of other large-scale reform efforts and their attempts to counter the three Ps – compelling teachers to participate in particular kinds of trainer-driven and administratively imposed professional learning communities (*contrived collegiality*), where teachers are required to meet to look at, respond to and implement the results of analyzing externally produced data and research (*professional dependency*), in relation to raising scores in short-term achievement results on a narrow range of tested subjects (perpetuating cultures of *presentism and conservatism*).

With the vision and freedom to become engaged with medium and long-term change, classroom teachers involved with AISI are grateful for the opportunity to study research and they integrate research findings into their ongoing professional development and classroom practice. Schools have changed as a result of AISI's work to provide more time and support for professional development, and to increase dedication to collaborative decision-making involving a wider range of participants. If there is any single area in which AISI is most advancing policy changes at the provincial level and throughout the wider culture of education, it is in this crucial domain of collective learning, connectivity among schools, and overall enhancement of capacity.

Teachers have also acquired new skills as researchers and micro-level policy makers who identify problems in children's learning, examine external research evidence, collaborate with colleagues to formulate potential solutions, and then acquire funding, skills and support to put their professional knowledge to work. Overall, more and more teachers have become accustomed to the idea that their long-term vision of educational change matters and plays a role in shaping the future policies of their province.

Along with changes in teaching have come shifts in how leadership is developed in schools. Leadership has come to include and encourage greater teacher leadership (Lieberman & Miller, 2004; Katzenmeyer & Moller, 2001) and distributed leadership (Harris, 2008; Spillane, 2006) – not everywhere and not always – but by taking on roles as consultants and coordinators and by securing slots of time in school to coach and mentor colleagues, teachers have increasingly spread their wings to be leaders of other teachers. Leadership is no longer confined to the principal's or superintendent's office but is increasingly being spread throughout the professional community, where it retains a close connection to classroom learning. This is a significant, inspiring and world-leading aspect of the changing culture of education in Alberta, at time when teacher leadership is little more than a cliché or a contrivance in many other jurisdictions.

AISI has also helped combat conservatism in the culture of teaching and administration by promoting a culture of risk-taking. In his remarks at the AISI Conference in February 2009, Alberta's Minister of Education, Dave Hancock, communicated that mistakes were to be expected and welcome along the way to meaningful school change. Such encouragement was very much appreciated by educators who were eager to pilot new initiatives and to take greater risks to reach disengaged students.

Teachers stated that AISI projects offered just the right amount of risk and reward for those who loved teaching yet also wanted to explore other dimensions of the educational profession. AISI enables teachers to develop new skills in the areas of experiential education, technology development, and local history that may not be directly linked to gains on provincial achievement tests but nonetheless have great educational value. This approach is integral to the deployment of 21st century professional skills in a rapidly changing, culturally diverse and knowledge-driven society. It is essential to a learning mindset.

There are three clear ways in which AISI does not yet seem to have influenced the wider culture of education and educational change in Alberta. The first concerns the existence of prior and parallel cultures of hierarchical leadership and administration in a number of districts. The second is related to the central administration of Alberta Education and its impact on school and district cultures. The final limitation relates to the need for extension of networking activities across districts to promote optimal learning among educators.

AISI initiatives and the ways in which they are developed are often absorbed into the existing cultures of administration within school districts, which they, in turn, seem to amplify. Districts organized on hierarchical lines with a narrative of management tend to decide on and impose a focus, invest in external packages and trainers, use resources to put coordinators into the district office thereby swelling the ranks of administration, and create little independent connectivity among schools. Lines of control are top-down, implementing administratively selected initiatives and making it difficult for schools to learn from each other. Districts with an ethic or narrative of service provide more trust, invest more heavily in relationships, and secure commitment to common goals, but patterns of implementation are still somewhat top-down and paternalistic, and staff overload is heavy. This restricts the opportunities for organizational learning.

Some of the educators interviewed in the 15 districts studied in the two qualitative components of the multiple perspectives review communicated that Alberta Education is not perceived as being part of a wider learning community. It is seen as a top-down, dissemination-oriented structure. So far, AISI's flexible, adaptable, participatory and networked approach with its broad conception of learning has interrupted this perception, but more as a refreshing alternative to larger transactional approaches that leave educators wary of other government initiatives.

AISI is, in many respects, a change of the Third and Fourth Way – flexible, adaptable, participatory, networked and broad in its learning goals. But the administrative structure of Alberta Education is still largely seen as operating more on the top-down and linear principles of the Second Way. The dislike of provincial achievement tests by teachers and to a lesser extent principals is undoubtedly part of this, and greater assessment literacy in the teaching profession as well as the development of a broader assessment portfolio in the province may moderate these perceptions somewhat.

The transactional model of Alberta Education is not unusual and seems to operate like most other education ministries. It is perceived by AISI participants as a system of central policy development that is then implemented through the hierarchical authority of individual superintendents and line-managed by principals below them. This system is often well organized to implement common programs and strategies. It is less suited to innovation and to developing practices that require local discretion. On the ground, AISI is in tension with the existing policy culture. But as AISI progresses further and policy goals also begin to incorporate more innovative elements suited to knowledge economy goals, this tension could become a creative and energizing one of productive disturbance.

Whereas AISI appears to be releasing the stranglehold of privacy on the culture of teaching in Alberta, there is a persistence of privacy and isolation between districts that inhibits the potential for learning and networking between schools and projects independently of detailed district control.

Within schools, AISI appears to be eradicating the longstanding presence of privacy in the culture of teaching. PLCs among teachers and administrators have been established to study the real and most daunting problems as well as the most inspiring and innovative challenges facing schools and then to develop new strategies for responding to them. These are not just individual teacher opportunities but collective professional responsibilities. This is an enormous achievement that has eluded educational reformers in many other jurisdictions around the world.

The greater challenge of privacy and isolation that classroom teachers have experienced in the past is now a different one. It is the privacy and isolation that insulates and separates school districts. This inhibits the potential for learning across schools and projects independently of detailed district control. While some districts have been able to surmount these problems, systemic decisions now have to be made on behalf of teachers and learners in the others:

> *Is AISI essentially going to an outlier to or even a safety valve for a relatively traditional provincial system of education?*
>
> *Or, in a context of the province's reinvention as a competitive and innovative knowledge economy within an increasingly diverse community, can AISI now be the catalyst for a more participatory and decentralized process of policy development?*
>
> *In other words, can AISI create a renewed and reinvented relationship between the central ministry and its districts as well as among the districts themselves?*

None of the people interviewed by the review team were able to point to horizontal (between and among districts) or vertical (across levels of organization, from schools through the Ministry) effects. No one was aware of what was going on in other districts in any great detail. What little was known appeared to be accidental. Given the pockets of remarkable innovation in the province and deep commonalities in interest, expertise, and activity across jurisdictions, the time seems right for inter-district networking that extends beyond the short-term encounters of annual conferences or the non-interactive structures of web-based archives. The more that this networking develops, the more there will be creative and hopefully productive tension with the existing culture of ministerial and district administration in Alberta.

To some extent, AISI enables and encourages a productive disruption of existing systems – constituting an important form of the disruptive rather than merely incremental innovation described by Clayton Christensen (1997; also Christensen et al., 2008). Here, disruptive innovations like the jet engine in relation to the propeller-driven one, the diesel shovel compared to the steam shovel, or laptops compared to desktops, do not introduce small changes to existing systems, but bring about significant step changes in the system as a whole. Like all complex systems, all the districts we studied are engaged in ongoing adaptation as new educational and contextual challenges arise, and these adaptive activities certainly preceded the introduction of AISI. However, by challenging districts to innovate, demanding accountability, and infusing a level of uncertainty around the maintenance of funding, AISI is providing a different-from-usual source of disequilibrium. It is not allowing districts to slip into a 'comfort zone' or to do 'business as usual.' It is unlikely that this sort of creative disruption would occur without AISI.

2.4 Is it possible for jurisdictions to do these projects and activities without AISI?

Educators tended to view AISI not so much as the point of departure for new values, but rather as an opportunity and funding source to realize values they already cherished but found difficult to fulfill.

Districts needed funding to support AISI consultants, to provide teachers with release time to learn from their colleagues, to purchase resources, and to send teachers to professional development activities such as the annual conferences of the Alberta Assessment Consortium. Especially in remote rural districts, the opportunity to leave small towns to access new ideas and research findings at provincial or regional conferences and establish lateral learning networks with educators in implementing them was priceless. Districts would almost certainly not have embarked upon many innovations and activities without AISI.

2.5 Would the values of AISI continue without funding?

Many participants from elementary schools said the cultures of their schools had changed and the practices that came about due to AISI were now embedded in their schools. In secondary schools, AISI values were embedded in some departments but others conserved a transmission model of education that did not promote student engagement. Gains are being made at the high school level, but AISI project leaders indicated that improvements require more careful modeling and support for faculty over time of the kind that appears to be the case in elementary schools.

The districts and cultures most likely to sustain AISI values in the absence of continuing funding are those that already operate as complex and effective learning communities. These districts have established the organizational cultures that support teachers' continued introspection, collaborative inquiry, and adjustment of instructional practices. Such districts organize their leaders and not just their teachers into PLCs to study data and research and to inquire into and improve instructional supports.

The Davis and Sumara study of contrasting district implementation indicates that some districts organize their cultures more around foci such as service and management that tend to concentrate leadership centrally and administer projects vertically rather than around learning, where both leadership and innovation are distributed more laterally and bound together by frequent, complex interaction. The former types of districts may find it difficult to accomplish the learning goals they have established for themselves because they conflict with pre-established institutional cultures that make learning subsidiary to service or management. AISI values can be piloted in such organizational cultures, but they cannot become embedded, and they are unlikely to be sustained without funding and also a development of networking structures within AISI that may stimulate productive disturbance of these existing district cultures.

Some educators expressed anxiety that AISI funding might be folded into base budgeting, let alone discontinued entirely, especially in a time of economic contraction. They worried that without clearly marked funding, the sorts of innovative, grass-roots projects associated with AISI will fade away. They feared that without continued support for AISI as an autonomous agency, their schools would not prosper from the opportunity to mature into the more complex learning systems and sources of innovation that Alberta will need for its students to thrive in the future.

2.6 What are the future challenges and action points for AISI?

The presentation and discussion of overall findings of our review points to a number of challenges for AISI and to future points where action might usefully be taken.

- AISI and those who participate in it first have to revisit AISI's goals – is it primarily concerned with improvement by disseminating existing knowledge, or with innovation that promotes the creation of new knowledge?

- Parent and community engagement, stronger connections to universities and the business community and sponsorship of cross-district networking are three areas in which connectivity can be significantly improved.

- The assessment and accountability agenda can be furthered by reviewing the ways in which student achievement data are collected and tracked and connected to data about school characteristics; by helping teachers to identify, design and employ more sophisticated instruments and indicators of impact and progress that are aligned with their project goals; and by mitigating teachers' feelings of accountability-overload by using measures in the spirit of assessment for learning that have direct diagnostic and improvement value as well as abandoning themes and strategies that are no longer priorities.

- A more explicit and systemic theory of leadership development may help transform the district and school cultures that serve as "hosts" for AISI projects, and lead to more effective forms of distributed leadership among the wider professional community.

- A clear and urgent strategy to reach and influence more high schools will significantly enhance AISI's credibility, as well as begin to make a dent in the provincial dropout rate.

- Last, in Cycle 4, the attention being paid to leadership development and networking, as well as to more flexible ways of administering timelines for funding may begin to move AISI from being a set of discrete or clustered projects with defined beginnings and ends to an integrated, long-term, complex policy process of improvement and innovation that forms a truly province-wide mosaic of learning.

These are the key findings and challenges posed by our multiple perspectives review. Our final task is to set out some recommendations for further development arising from them.

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Chapter 8: Recommendations

By Andy Hargreaves, Robert Crocker,
Brent Davis, Lori McEwen, Pasi Sahlberg,
Dennis Shirley & Dennis Sumara

1. Introduction

This final chapter of our report makes suggestions and recommendations for the future of AISI. These are drawn and developed from the same sources as our findings.

As we present these recommendations, we do so from the combined perspectives of appreciative inquiry and critical friendship that have guided this review and all its components. We have been impressed, at every point, by the openness and receptiveness of the School Improvement Branch (SIB) team to constructive feedback. The absence of defensiveness is admirable. Our findings and recommendations are addressed to a culture and community we have found to be characterized by the most productive combination of commitment and doubt.

We note, for example, how responsive the SIB team has been to the discussions about AISI, its impact and its future to which AISI staff, AISI partners, participants from AISI sites, as well as critical friends such as ourselves contributed during the October 2008 AISI Colloquium. Many of the new submission criteria for AISI Cycle 4 are clearly a direct result of this organizational learning, and spirit of self-critical inquiry in pursuit of professionalism, improvement and enhanced learning for all students that epitomized that Colloquium. Thus, many of our recommendations in areas such as leadership, network development, cross-district collaboration, and extended partnerships have already been signaled by AISI leaders as key priorities for Cycle 4.

As an advanced organizer, our recommendations for future action particularly concern the following issues:

1. *develop* improved ways of collecting and compiling provincial achievement data that will make it possible to trace the impact of complex but distinct initiatives like AISI;

2. *create* leadership and support systems for teachers and administrators involved in AISI projects to access existing data bases, request and receive data analysis services, and design their own instruments and indicators of accountability that are appropriate to their project goals;

3. *extend* AISI project content and processes towards greater involvement of parents, community members, businesses, universities and other partners;

4. *increase* AISI's attention to and impact regarding innovation and improvement in high schools, with particular reference to increasing Alberta's relatively low rates of high school completion;

5. *invest* in province-wide networks that cut across districts, that reach beyond annual conferences and that incorporate proven design principles of effective network architectures that have clear, positive impacts on system-wide outcomes for students;

6. *develop* leadership skill and capacity among *all* principals and district-level leaders so that the effectiveness of AISI projects does not suffer when existing leadership capacity in particular schools and districts is not strong;

7. *embed* AISI into Alberta Education as an integrated policy strategy. Do this without diminishing the attention, resources, advocacy and professional development regarding the distinctive approaches to professionally driven, locally adaptable and laterally networked processes of improvement and innovation that AISI has championed.

2. Six Thematic Areas

Our recommendations are grouped into six thematic areas:

1. Preservation
2. Purpose and focus
3. Impact
4. Culture
5. Structure and funding
6. Leadership

2.1 Preservation

AISI should be continued as a provincial priority. AISI is a unique, world-leading strategy for developing innovation, and improving professional quality and engagement in teaching. At the end of its first decade, it shows clear evidence of positively impacting teacher professionalism, of creating and sustaining a professional culture of inquiry and innovation, and of serving as a professionally inclusive vehicle for delivering a number of key provincial reform and improvement priorities such as professional learning communities and assessment for learning. AISI does so within a budget that is a very small percentage of the overall provincial total for education, and without any evidence of prejudice to standards and achievement results on provincial achievement tests in a context of shifting student and community demographics that are bringing more immigrant groups and second language learners into the province.

Provincial achievement tests and similar measures are important instruments of monitoring traditional kinds of achievement and ensuring public accountability. Some have held out the hope that AISI would have positive consequences for achievement measured in these terms, though because of the limitations of existing data sources and collection procedures, demonstrating any such connection has been elusive despite the most stringent efforts. Nevertheless, AISI does not appear to harm provincial achievement scores at a time when it is releasing innovation and renewal into the education system of Alberta.

Vitally, AISI also addresses and fulfils other important goals within the public education system of the province. In an era following a global economic crisis, and at a time of great volatility in energy prices and demands, economic diversification is an essential public policy priority for every jurisdiction, including Alberta. Education systems therefore need to demonstrate outcomes beyond conventionally tested basics in order to create flexible cultures of creativity and innovation in schools and society, and in ways that harness and heighten the capacity of high performing teams to deliver what are now being described as inalienable 21st Century skills for economic competitiveness and ecological survival – and all within a context of growing cultural diversity (OECD, 2001; Hargreaves, 2003; Wagner, 2008; Partnership for 21st Century Skills, 2009). Students must be educated to join the innovative, high-performing teams of the future economy. Engaged and innovative teachers who model such high performing teams and share their skill sets with their students are the only possible professionals who can deliver those outcomes for our students.

AISI's strengths and distinctive contributions that are particularly worth preserving are:

- Its *culture of creatively combining existing resources, ideas and assets in the service of continuing and sometimes disruptive innovation*. AISI is a vehicle for enhancing implementation of provincial priorities, but it is also a funded and favored niche for fostering innovations and innovative cultures that extend, add to and sometimes even creatively disrupt those priorities. It is unlikely that a diffuse and even disruptive culture of innovation could be sustained without the targeted efforts of AISI.

- Its *strategy of targeted funding*. This ensures that amid all its other pressures and short-term demands, the provincial education system will continue to prioritize the innovation and professional engagement that is essential to the province's long term future. Given that it is in the nature of innovation that some of it will fail and not all of it will yield immediately measurable results that can obviously be scaled-up, Alberta's politically stable environment is an immense asset in enabling the province to maintain its commitment to supporting educational innovation through AISI. In *The Innovator's Dilemma*, Clayton Christensen (1997) shows that most organizations' initial innovations tend to become normalized over time, inhibiting other innovations in the future. This is the paradox of innovation and sustainability. His advice, therefore, is that all large organizations should allocate a definable portion of budget to supporting future innovations, even and especially when they challenge those that have been successfully been implemented in the past.

- Its promotion and achievement of *increased teacher professionalism*. High performing education systems such as that in Finland are founded on being able to attract, retain and develop teachers who practice strong professionalism together in relationships of curricular and pedagogical collaboration (Hargreaves, Halasz, & Pont, 2008; Sahlberg, 2006). Alberta already has a strong and internationally envied tradition of involving the teaching profession in significant system-wide changes such as curriculum developments and provincial achievement test designs. AISI's results point to further and more widely distributed effects of heightened teacher professionalism. At the very least, there is a positive Hawthorne effect of teachers valuing initiatives that, in turn, value their skills, judgment and involvement. More than this, AISI provides teachers with clear opportunities for making self-initiated changes that they especially value, rather than implementing externally imposed mandates that come from afar (Hargreaves, 2005). It also creates many new opportunities and expectations for teacher leadership of colleagues and of improvement efforts. This is increasingly being acknowledged as essential to successful school improvement (Harris, 2008; Spillane, 2006).

- Its increasing commitment to *networking across schools*. Most teachers do not perform consistently well, or learn how to improve, if they teach entirely alone. This is why there are professional learning communities. Most schools do not improve either unless they are able to learn from other schools. This is why it is important to develop networks. In the past, networks have often been open-ended and permissive and created a lot of interaction and activity but without much impact. At the other extreme, in other provinces and systems, schools are sometimes brought together in clusters to implement system mandates, but this does not induce innovation or increase professionalism. The reports comprising this review show clear evidence of networks emerging across a number of school districts that increase the connectivity that is essential for innovation and improvement in complex and fast-moving systems. AISI has a particular and prioritized network architecture for developing this connectivity. Although this architecture requires further development, it is a unique aspect of AISI that is unlikely to originate in or be sustained by any other aspect of provincial strategy.

- Its distinctive commitment to developing a widespread culture of *teacher-based inquiry*. The commitment to teacher-driven research and inquiry is not unique to AISI, but the form it takes, and the extent of its reach are. Elsewhere, advocates of professional learning communities support and even institutionalize school-wide analyses of data as a basis for action, but these inquiry activities are often confined to and consumed by preoccupations with identifying statistical gaps or shortfalls and designing rapid interventions that will yield short-term results (Datnow, Park & Wohlstetter, 2007; Dufour & Eaker, 1998; Shirley & Hargreaves, 2006). Indeed, some provinces and countries have implemented such processes extensively as key elements of their reform strategy (Barber, 2007; Fullan, 2006; Levin, 2008). AISI offers a different approach to inquiry that engages in deeper, mindful and more sustained engagements with the nature of student learning and with the changes that teachers need to make in their own teaching (Cochran-Smith & Lytle, 2009; MacDonald & Shirley, 2009). This is more likely to lead to longer-term transformations in teaching and learning that are more suited to the development of 21st Century knowledge and skills.

- Its emphasis on *innovation and interaction with accountability*. AISI provides a protected space for innovation and incentives for increased professional interaction, combined with the essential accompaniment of internal and external accountability. Not all AISI educators are satisfied with the expectations for accountability, and we have some ensuing recommendations for streamlining them as well as making them more stringent, but the inclusion of accountability criteria related to reporting what was done, determining its impact, and designing revised plans as a consequence, is an indispensible ingredient of an initiative like AISI. This does not mean that educators involved in AISI projects should feel pressed to demonstrate early or eventual success on every occasion – the point is to demonstrate and stimulate learning, even and often from failure as much as from success; for this is the essence of innovation and the relentless quest for continuing improvement.

2.2 Purpose and Focus

After ten years, and more than three cycles, it is time for AISI to clarify, renew and redefine its fundamental goals. AISI is already pushing its program priorities into new areas such as leadership, parent and community engagement and network development; many of which are not only worthwhile initiatives and directions in themselves but they are also ones that will help create increasing cohesion for AISI as a strategy of knowledge development and dissemination.

It is important for AISI to establish clear priorities. Sometimes these purposes will align closely with and help implement the strategic thrusts of Alberta Education more widely. This approach carries both benefits and risks. We note that different cycles have witnessed a significant critical mass of projects devoted to differentiated instruction, professional learning communities and now, assessment for learning. In many ways, this synchronization of AISI with wider strategic directions is admirable and to be encouraged. At the same time, it is evident that these thrusts and priorities typically have packaged programs of external trainers and training attached that can be high in consultant costs, ephemeral in influence and evanescent in impact, once the trainers and their albeit engaging and entertaining workshops have passed by. There is a concomitant risk that training and trainer-dependent packaging on a large scale can actually create the kinds of professional dependency on outside expertise that AISI in many ways is designed to counteract with its emphasis on school-initiated innovation.

These issues of synergy raise questions about whether AISI is now so institutionally embedded in the system as a way of making change that it should no longer be treated as a separate initiative. At the same time, data that show early signs of some tailing off in teacher satisfaction levels and other outcome measures suggest a need for other approaches within the AISI design to keeping innovation going and pushing new initiatives forward. And it is clear that while some aspects of AISI are indeed embedded into the wider policy and change process, others, such as its approach to networking and interconnectivity among schools have not yet been pushed or embedded far enough.

Finally, in considering our recommendations in the realm of purpose and focus, we are aware that the impact of AISI seems weakest in the high school sector. With high dropout rates being a significant concern within the province, it is important to find a way of increasing AISI's energy and impact within high schools as a way to leverage innovation in this traditionally hard-to-change domain. Too few AISI projects have been focused on improving high school completion rates – a highly targeted area that would also be easy to measure.

Taking into account our findings on AISI and its impact, we therefore advance the following recommendations about purpose and focus:

- *Rename and redirect AISI as a process or a network*; not an initiative. Initiatives in excess eventually become professionally discredited as patterns of innovation and improvement. After a decade of operation, it is also stretching the argument to call anything an initiative any more. The designation of AISI as a network or process will be a signal of AISI's robust embedding, rather than conditional and marginal presence within an ongoing approach to innovation and improvement in Alberta Education.

- *Reconceptualize AISI as a bridge to 21st century learning*. AISI's distinctive asset and approach is not in delivering better results in existing and more conventional approaches to learning and achievement. It is in developing, deepening and delivering the new kinds of learning that are essential for the province's competitiveness in a future knowledge economy (OECD 2001, 2008) and also for its contribution to combating and adapting to the imminent threat of climate change (Giddens, 2009), through embracing the international advocacy for education for sustainable living (Senge, forthcoming).

- *Refocus AISI around innovation and renewal as well as improvement*. It should more strongly and explicitly promote innovation and creation of new knowledge; not only dissemination and diffusion of existing knowledge that is embedded in provincial priorities, or in the packaged programs of externally hired consultants and trainers. Our evidence indicates that AISI projects already sometimes create new knowledge. They innovate, inquire and initiate as well as implement and disseminate. This does not mean that all new knowledge should start with the school. It is not the origin of knowledge that matters but the way it is processed. The strongest and best-led school cultures are able and eager to take knowledge from many sources (including central programs and external trainers) and make it their own by connecting it, combining it, reworking it, inquiring into it and adapting it to their own needs and circumstances (Abrahamson, 2004; Hargreaves, 2005). Understanding and extending this capacity for creating new local and generalized knowledge of learning is an immense opportunity for AISI.

- *Concentrate disproportionate efforts and resources on innovation and improvement in high schools.* AISI currently seems to make the weakest inroads into high schools. High schools are the leviathans of school reform and improvement – large, content-driven, constrained by examinations and framed by university qualification requirements (Goodson, 1994). The strongest leverage for initial change is often in smaller subjects, among younger teachers, with diverse populations, in traditionally more marginalized areas like counseling and special education, or within lower grade levels (Skerrett & Hargreaves, 2008). The challenge is then how to spread innovation throughout the higher status areas of the high school community. Achieving greater success with AISI in high schools is unlikely to come about just by greater exhortation. Focused effort and targeted funding may be required, with perhaps disproportionate and protected resource allocations being directed towards high schools until change momentum has been established. Promising starting points might be in the existing commitment to improving high school retention; developing curriculum innovation for 21^{st} century skills across the curriculum or within mainstream subjects such as mathematics and science; and developing innovation and connectivity in the years preceding and following student transition to high school.

- *Increase priority for proposal and actions that plan to increase parent and community engagement* in their children's education. The First Way of change was characterized by *passive trust* where parents unconditionally trusted professionals with their children. A period of *active mistrust* then set in as the public looked to external accountability instruments to guarantee commitment and quality. In the Third Way, progress in measured results secures *public confidence* in the education profession. The Fourth Way moves on from this position and develops *active trust* between professionals, parents and community members working side by side. This approach is about developing and organizing communities to be stronger advocates for and supporters of their children, not just about delivering government services to communities in need. AISI can make a significant mark by promoting more open kinds of teacher professionalism in which the boundaries between teachers and diverse communities weaken, and patterns of mutual influence, trust and respect grow actively between them.

- In summary, *highlight and broadcast AISI's prime purposes as ones that encompass improvement, innovation, and professional engagement to develop and demonstrate 21^{st} Century learning.* This refinement of purpose and direction, we believe, will infuse new energy into AISI and the Alberta teaching profession, and maintain momentum at a time of dramatically shifting educational and economic needs.

2.3 Impact

Whatever the goals of AISI or any other educational change strategy, it is crucial to be able to determine what impact the strategy is making. Impact assessment is essential for establishing external accountability, public confidence and justification of resource allocation in relation to other priorities on the one hand; and as part of the recurring cycle of improvement across the strategy and within every district and school on the other. Without impact assessment, confidence wanes, resources become hard to justify, and there is no evidence or feedback to guide or prompt efforts to improve or refine chosen strategies.

Our review indicates that educators are sometimes critical and even resentful of existing accountability mechanisms. Required paperwork at the end of each cycle seems excessive in its call for narrative accounts of what actions were taken within projects and what consequences ensued. This sometimes makes AISI feel like an imposition rather than an opportunity. Many of the quantitative measures chosen to document impact seem to be selected because of their easy availability rather than their usefulness in evaluating particular projects. Provincial achievement test data are easily accessed, for example, but not necessarily the most useful as measures of efforts to develop new kinds of learning. Satisfaction surveys similarly often seem bland, weak, and too easily pulled down from the provincial menu of instruments rather than acting as fine-tuned instruments to assess precise forms of impact. There can also be a culture of implied expectation to exaggerate or fabricate success when, in the case, of innovation, it might be more useful to demonstrate what has been learned and what actions might be taken as a result. Finally, the existing program structure of three-year cycles can make accountability requirements feel excessive, repetitive and overwhelming.

In reviewing our evidence, the conclusion we reach about impact and accountability requirements is that they should be streamlined, made more stringent, be more embedded and actively utilized within each project's process of diagnosis and inquiry, and be the subject of expert and ongoing technical support that is differentiated according to levels of need and existing capacity in each project. Specifically, this leads us to make the following recommendations:

- *Streamline external accountability requirements by reducing the length and frequency of external narrative reporting*. The exceptions would be where there was a clear purpose for the reporting other than accountability per se. Thus, some schools or districts might produce lengthy reports on a sample basis, if the schools were to be visited by a review team at a later point to engage in dialogue with them about the future of their project. Other reports might be extended in exemplary cases for the purposes of publication and celebration of successful, or especially innovative practice.

- *Continue and extend systematic research into the impact of AISI as a system.* AISI already has an impressive record of cycle-by-cycle reviews, quantitative and qualitative evaluations, project self-reports, and this multiple perspectives review. We encourage AISI to continue this work and also to go further – especially in the quantitative domain, by developing and utilizing other objective and robust indicators of impact than the existing measures which are readily accessible but designed for other purposes and also, sometimes, other kinds of learning and learning outcomes. Such measures should include:

  - Robust measures of student learning and impact on student learning in more creative and applied areas of 21st century skills such as those measured by the international PISA tests, those that ask students and teachers what ways of learning they value most and how often they experience them etc.

  - Adoption of existing scales related to stages of implementation and levels of use (e.g., Concerns-based Adoption Model) in order to determine how successfully initiatives have been implemented, whether these have reached only levels of awareness through external training strategies or have been integrated into teachers' practices, and whether initiatives have spread beyond a few early-adopters to teachers whose approaches to change are more cautious or even resistant.

- *Establish an AISI Institute of Data* (AID). This will comprise a systemic support service that enables teachers and researchers to make more efficient and effective use of existing data, to be aware of and access the instruments that are most appropriate for their projects, and to develop their own instruments as necessary. AID would collect, compile and compute data related to individual student numbers more swiftly and efficiently than teachers themselves – thereby significantly streamlining the accountability and inquiry process. As in the long-established Manitoba School Improvement Project, AID could also advise teachers and schools in provincial and regional conferences, as well as district by district, about how to select, develop and utilize instruments that enhance the process of inquiry as an integral part of continuous improvement. This local support function of AID might be most effective if the structure of AISI cycles and the associated proposal process were redefined (see below).

- *Initiate a project review process on a basis of sampling, invitation and/or need.* An AISI-wide continuous systemic review process might be enhanced further if it was not itself tied into three-year cycles, evaluating projects that had finished, once the work was over, but if it also followed the principles of assessment for learning and became an integral part of the improvement and innovation process itself. Thus, a central review team established by AISI might undertake sample reviews of projects-in-action, connecting an extended internal review and narrative by the project team, with a 2-3 day site visit and external review by the Central AISI team. This would contribute to monitoring of quality, and to assessing the ongoing needs for both celebration and support throughout the initiative. Sites for review may be selected by random sample, by invitation from the sites, by indications of the opportunity to record instances of exceptional exemplary practice, or by need for assistance when schools or districts appear to be struggling. This leads to the final recommendation of this section.

- *Clearly and transparently identify sites that have achieved different levels of development, impact or success* in terms of robust and diverse outcome measures. Without such a clear and transparent system, successes cannot be celebrated, nor can weaknesses or difficulties be pinpointed and assistance then offered or assigned accordingly. Highly successful networks elsewhere that bring about systemic improvement (as well as individual examples of innovation) are prepared to identify and acknowledge different levels of success in terms of impact (Hargreaves & Shirley, 2009). Only in a transparent system of differentiated degrees of success can schools offer and seek assistance from peers who are addressing similar issues to themselves, and only in such circumstances can there be a clear and accountable basis for providing external support. This presents a significant challenge to some existing cultures of teaching and professionalism that are articulated by a particular kind of equity ethic – so we return to this recommendation later.

2.4 Culture

AISI has strengthened and extended a professional culture of teaching in Alberta that is already distinctive. It has valued teachers as active agents of change, not merely passive implementers of others' changes. It has promoted innovation, improvement and inquiry. It has validated the power of discretionary and reflective judgment as a fundamental aspect of professionalism. AISI seems to have exerted a positive Hawthorne effect, with measures of teacher growth being directly correlated with AISI's development as a result of the additional motivation teachers get from having their own professional efforts recognized, rewarded and resourced.

AISI is the product of collaboration among many partners and its design promotes collaboration within and between schools as a basic principle of professionalism and change. Teacher collaboration and growth within schools has already resulted from AISI, partly through the attention to developing professional learning communities. Collaboration across schools has also become more extensive after the Venus-like, individual school initiative phase of Cycle 1. The further development and continued success of AISI depends at this point on extending and deepening collaboration and partnership in three ways: widening the range of collaborative partnerships; forging stronger connections and networks among schools across districts; giving collaborative work a more explicitly critical edge and instigating collaborative relationships of support and assistance between sites that are unequal in levels of capacity for change, or in stages reached in implementation. Three recommendations follow:

- *First, widen AISI project partnerships.* Widening partnerships extends both commitment and capacity. Partnering with parent and community organizations develops a more open professionalism and involves many agents who can actively contribute to the development and success of individual students. Responsible business partnerships, where businesses give time and service to educational projects as part of their role as corporate citizens rather than in search for direct, short-term returns on investment, builds capacity for improvement, develops the profile and credibility of AISI within the business community, and gives positive energy to developing the 21st century skills that are essential to the changing economy. Last, while many universities have developed *ad hoc* partnerships with AISI and many include AISI links on their website, there is significantly greater opportunity to access the research and inquiry resources and capacity of universities by forming structured research partnerships, government-university research and development collaborations, and collaborative bidding processes for Federal grants linked to AISI through agencies such as the Social Sciences and Humanities Research Council. Enhanced partnerships with universities will also strengthen the utility of university research for professional practice in schools, as well as cultivating greater respect, understanding of and learning from professional practice by university research faculty.

- *Second, provide incentives for network development across school districts.* Since Cycle 1 of AISI, networking has rightly become a progressively important priority within each successive cycle. It is one of the approved directions for AISI in Cycle 4. Networks help educators and their schools learn from and improve with one another. They break down the insularity, privacy and even secrecy of individual schools and their districts. They provide a means for strong and innovative practice to be diffused and for successes to be scaled up across the system. They also offer opportunities for institutions and individuals with greater capacity in particular areas to assist professional peers who are less well equipped or who have not progressed as far. Networks are increasing in strength and effectiveness in many districts, but not in all of them. They are stronger among teachers, very often, than among administrators – though a few districts have established professional learning communities across schools among administrators. Apart from annual AISI conferences and occasional workshops though, network development across districts is weak. This limits progress in developing the further learning, improvement and cohesion that is essential to AISI's success.

Connections among districts typically have been coordinated centrally in relation to government implementation priorities. Inter-district coordination also occurs through conferences, meetings and other kinds of representation among district-level leaders. These can often be effective mechanisms for delivering centrally driven initiatives and strategies. They are ineffective structures, however, for coordinating and connecting school-initiated strategies of the kind developed within AISI. With no effort at inter-district coordination, school initiatives become disconnected and diffuse as in Cycle 1. If all the direction comes from the Centre, then AISI simply turns into another arm of government implementation – in relation to already established priorities, training packages and the like; lessening the likelihood of both innovation and sustainability, and contrary to the intended culture and purposes of AISI.

There is a powerful need, therefore, to encourage and create incentives for district-to-district and cross-school/cross-district networking sometimes with and sometimes independently of district leadership control as a way to build capacity, accelerate diffusion and enhance organizational learning. This is an important priority everywhere but may be most needed in those districts where school-based AISI projects make the least progress because of excessively weak or overly controlling district leadership. In these cases, AISI networking could actually create productive, disruptive innovation within districts of the kind that Christensen (1997) describes. Drawing on experiences with successful networks and partnerships elsewhere (e.g., Hargreaves & Shirley, 2009), inducements and incentives might lead AISI staff to:

  - Target funding allocations within the overall AISI budget for cross-district collaborative projects
  - Require plans for networking of results and activities across districts within all AISI submissions
  - Further review AISI's website design to increase attention to cross-district knowledge-sharing – although the Clearinghouse is already rich in information
  - Structure conference activities so they do not only promote showcasing of exemplary efforts, but also expect schools to seek out and interact with partners, and set norms for transparent displays of participation and results among all AISI projects
  - Provide a protected travel budget for teacher inter-visitations across the province
  - Designate funding for a leader of cross-district networks and other partnerships

- *Third, create processes and protocols for critical discernment of professional practice.* The culture of teaching is sometimes reluctant to publicly accept or acknowledge different levels of expertise or degrees of success in professional practice. While it is immensely important to share and celebrate successes and communicate examples of interesting and innovative practice, the culture of teaching, like the culture of self-esteem, can sometimes produce an over-celebration of all practice that admits the existence of neither exemplary success nor of problems and shortcomings. Learning and improvement involve learning from mistakes, and working with mentors whose performance is, initially, superior or advanced. This does not mean that stronger or weaker schools or districts perform better or worse on everything – but it does mean being able to acknowledge and identify different levels as well as types of professional practice. Connecting schools that are operating at different levels with similar types of students can, as other provinces and countries have demonstrated, lead to narrowing of achievement and learning gaps (Fullan, 2006; Hopkins, 2007). This connectivity is vital not only when implementing central reforms such as literacy strategies however, but also among schools attempting similar innovations or initiatives, or with variable capacity in leadership or networking capabilities. Deepening the critical, reflective dialogue among AISI sites can be achieved by a number of measures, including:

  - *Self evaluation and external evaluation* processes that engage insider dialogue with outsider perspectives
  - Deployment of *specific protocols for professional interaction* such as that used by critical friends networks, that promote feedback that is constructive, affirming and also critical in nature.
  - Use of *more robust internal evaluation instruments* such as those that assess impact on student learning, and stages of implementation
  - Deliberate and transparent *partnering of AISI sites that have different levels of expertise, capacity or progress* in implementation
  - Developing *strong norms of specific public self-criticism* rather than more generalized kinds of modesty and humility in the most exemplary, successful cases so they model the value and necessity of learning from mistakes to their peers

2.5 Structure and Funding

Practices are embedded in cultures that value particular kinds of interaction among members of a community. Structures of roles, resources, time and space both create and constrain opportunities for these kinds of interaction. By intent or by accident, they permit and push some practices and also prohibit others. AISI has several key structures that are linked to its purposes. These include a formula for distributing resources across geographical space; funding cycles that orchestrate project activities over time; proposal procedures that signal criteria of acceptance and rejection; and design features such as province-wide conferences that promote or proscribe patterns of interaction between AISI schools and districts. In line with our observations about the shifting purposes and priorities of AISI, with the need to have a sustainable as well as successful strategy, with the need to maintain and renew momentum, and with the need for a more challenging culture of professional interaction and evaluation, we make several recommendations in relation to reviewing, revising and renewing the structure and funding of AISI.

- *Redesign a more flexible funding and proposal cycle.* Three-year AISI cycles may be too long or too short – it depends on the purposes. Some sites may want to experiment with a small-scale innovation in literacy for boys. Others may want to transform their entire high school structure. The time scales for design, implementation and possible success in each of these cases are profoundly different. If everything is subjected to an identical timeline irrespective of need, it converts a cycle into a treadmill - as a number of participants more than hinted at in their remarks. Auto assembly lines in the 21st century economy now have to be flexible, not standardized. Public sector organizations need to follow the same customized path towards increased and enhanced flexibility. AISI already leads the way in this respect in supporting projects of 1, 2 or 3 years' duration. In addition, it encourages submissions that build on and deepen past projects. This flexibility can be extended by encouraging proposals for longer term projects at the outset, the first stages of which are the target of requested funding. There is also evidence that some educators regard the three-year cycles as requirements and there perhaps needs to be clearer and stronger communication about the options available.

- *Develop funding formulae that are demonstrably tied to and differentiated by need* in terms of factors such as the difficulty and complexity of the project being undertaken, the degree of innovativeness suggested by the project, the amount and depth of collaborative engagement with other partners, the importance of the priority within AISI and the province (for instance, that of high school reform) and the size of the unit undertaking it. This raises the possibility of differentiating and targeting funding into different "pots" that each become the subject of different groups of proposals and bids. Such a process would customize resource allocation more closely to need, release it on flexible time schedules driven by the nature and need of the project and the characteristics of the site bidding for it, and sharpen the thinking and planning of proposers in relation to the focus and direction of their projects. This would represent a step away from the current use of per-capita funding which is less adaptable and responsive to local need.

- *Provide a centralized resource for data collection and management*, and reallocate some AISI funding for this from individual site proposals to the previously mentioned agency we tentatively named AID (AISI Institute of Data), in order to streamline the processes of accountability and site-based inquiry.

- *Define clear guidelines and criteria regarding proscribed uses of AISI funding* – for instance, for proposals that use AISI resources to replace professional development funding in a district; for proposals that have no plans for sustainability; or for proposals that establish physical or technological infrastructure rather than promoting and enhancing new and improved practices of teaching and learning.

- *Redesign the proposal process from one based on selection to one that explicitly promotes learning and development* so that the most common outcome is not one of acceptance or rejection but of resubmission with the assistance of a technical support team of AISI advisors. This team can provide support on such matters as how to collect and compile impact data, what factors to consider in relation to sustainability, and how to use trainers effectively so that sites interact intelligently with the models advocated by trainers, rather than implementing external initiatives uncritically. The proposal process itself thereby becomes a distinctive feature of AISI's developmental design – fostering learning and connectivity even at the point of application.

- *Extend or reallocate a proportion of AISI's resources to expand and deepen the networks and partnerships that are essential to its further development and impact.* This might include increasing the number of conferences that bring AISI sites together, and doing so around clear principles of transparency of participation and results. It might also include funding allocations for inter-visitations across districts, especially where there are clear gaps of expertise and capacity between different sites. Specific additional funding for involving other partners such as university researchers in the development and evaluation of AISI innovations also offers a useful way forward.

- *Launch an international conference and think tank bringing together experts with practical experience of leading school networks of innovation and improvement that have clear connections to results.* This expertise exists in a number of countries including Finland, Australia, Singapore and England. Drawing these groups together would help AISI redesign its architecture as an effective province-wide network.

2.6 Leadership

There is rarely lasting change without leadership. AISI creates significant opportunities for increased teacher leadership and for further career development beyond but not necessarily instead of the classroom. AISI, in other words, increased leadership density in schools and school districts (Sergiovanni, 1984). Some AISI projects rely heavily on teachers promoted into coordinator roles and this raises the question but also the opportunity of developing internal leadership capacity behind them in their schools when they move into the district office. Other districts develop more creative uses of teacher leadership by buying proportions of time of multiple teachers so they can also experience leadership with and of their colleagues without abandoning their classroom roles and leadership of students.

At the same time, success in AISI projects seems to depend strongly on the effectiveness of principal and superintendent level leadership within the district. Some districts and their initiatives benefited from outstanding leadership of more than one kind. The ones that appeared to struggle or falter had high-level leadership that was either weak, excessively controlling and inflexible, or isolated from other schools and districts. The impact of AISI projects depended strongly on prior leadership capacity in being able to create a sense of direction and purpose and unleash the innovation and connectivity among professionals across the system.

AISI is already committed to developing leadership capacity as part of its Cycle 4 priorities. It largely does so by advocating increased commitment to shared leadership. We agree with the importance of this emphasis but unless it is unpacked a little it could be misleading. The paradox of leadership appears to be that effective shared or distributed leadership does not only call for more teacher leadership, but also requires sophisticated levels of inner strength, courage and confidence among high level leaders. In closing our report, we therefore conclude with some recommendations regarding leadership development.

- *Make leadership development a clear AISI project priority* and desired outcome, not an assumed precondition of success. This means sharpening the leadership emphasis even further in Cycle 4.

- *Continue to affirm and expand the role and density of teacher leadership* in AISI schools, balancing the needs of district coordination with the continuation of leadership capacity building within schools.

- *Provide specific training and support for principals and district level leaders*, in conjunction with their professional associations, *in relation to network leadership* and the development of shared responsibility for change.

- *Promote focused interaction and networking among and across school leaders and district leaders*, that are characterized by mutual support, candid discussion, honest recognition of differences in degrees of success and implementation, clear protocols that promote critical dialogue, and open professional interaction in a culture of collaboration, inquiry and commitment to improvement.

3. Conclusion

AISI is an impressive change strategy that is perhaps without parallel in the world today. It contributes to teacher development and educational change in a manner that is stable, steady, and credible among the educators it most seeks to impact. AISI leadership is transparent, responsive, and trustworthy.

AISI has built a solid foundation to further evolve and address some of the most tenacious problems in educational change today. In the years ahead, AISI leaders should build upon their many accomplishments and expand the most important themes and strategies of AISI into new arenas. AISI should further promote learning across district lines and should increase parents and community engagement in schools. More concerted efforts and sustained support need to be provided to high schools to engage students and to transform learning. In general, more flexible and also more targeted approaches to funding and funding cycles may help achieve these goals.

AISI is already promoting some of these changes in its new cycle of projects. It is imperative that AISI act decisively and boldly in leading the changes. AISI has a unique change architecture. It treats the learning of students, teachers and organizations not as a line, or even a circle, but as a complex, interlocking mosaic. AISI is a complex model of improvement and innovation and also a transparent and participatory one. This is why it enjoys increasing visibility not only in Alberta or Canada but also among policy makers in other nations. AISI's continued progress within one of the world's very highest performing systems will be keenly observed by scholars of educational change and policy makers focused on improving student learning from around the globe.

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